

MARCH 1994

# NASA AERONAUTICAL THESARUS (CURRENT) STRUCTURAL DATA

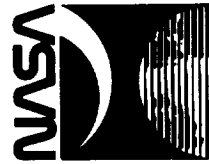
M - Z

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HIERARCHICAL UPDATE (CUMULATIVE).  
M-Z (NASA Center for Aerospace  
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STI PROGRAM  
SCIENTIFIC &  
TECHNICAL  
INFORMATION

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### **For more information about the NASA STI Program, you can:**

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**MARCH 1994**

**THE NASA ARCHIVE  
STRUCTURED  
(TECHNICAL)  
DATA**

**M - Z**



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## NASA THESAURUS HIERARCHICAL UPDATE

Primarily an 'in-house' publication for NASA and the foreign contributors to the NASA STI Database, the Hierarchical Update cumulatively updates the Hierarchical listing of the 1988 edition of the *NASA Thesaurus*. The complete Generic Structure is included, showing all the interrelationships of the broader and narrower terms. Category numbers are given for each term and correspond to category numbers found in Volume 3 of the 1967 *NASA Thesaurus*.

The location of an entry term within a hierarchy is indicated by a pound sign (#). Array terms are identified by a percent (%) sign.



```

RT LYMPHOCYTES
  LYMPHOCYTES
    0403 0404 0406
    GS CELLS (BIOLOGY)
      .BLOOD CELLS
      .LEUKOCYTES
      .LYMPHOCYTES
      .IMMUNE SYSTEMS
    RT LYMPH

LYOPHILIZATION
  USE COLLOIDING

LYOPHILS
  USE COLLOIDS

LYRA CONSTELLATION
  3001 3503
  GS CONSTELLATIONS
    #LYRA CONSTELLATION
    RT CELESTIAL BODIES
      CELESTIAL SPHERE
      STARS

LYSERGINE
  0403 1808
  GS BASES (CHEMICAL)
    .ALKALOIDS
    .LYSERGINE
    NITROGEN COMPOUNDS
    .ALKALOIDS
    .LYSERGINE
    ORGANIC COMPOUNDS
    .CYCLIC COMPOUNDS
    .HETEROCYCLIC COMPOUNDS
    .ALKALOIDS
    .LYSERGINE

LYSIMETERS
  0501
  RT GROUND WATER
    MOISTURE CONTENT
    PERCOLATION
    SOIL MOISTURE
    SOILS
    WATER BALANCE
    WATER POLLUTION

LYSINE
  0402
  GS ACIDS
    0403 0404
    .AMINO ACIDS
    .LYSINE
    .CARBOXYLIC ACIDS

M STARS
  1411 1412 2306 3001
  GS CELESTIAL BODIES
    .STARS
    .LATE STARS
    .COOL STARS
    .M STARS
    .VAN BIESBROECK STAR
    RT ASYMPTOTIC GIANT BRANCH STARS
      FLARE STARS
      GIANT STARS
      MAIN SEQUENCE STARS
      MIRA VARIABLES
      RED GIANT STARS
      S STARS
      SUBGIANT STARS
      SUPERGIANT STARS
      SYMBIOTIC STARS

M WINGS
  USE VARIABLE SWEEP WINGS

M-1 ENGINE
  2806 2808
  UF AJ-1000 ENGINE
  GS ENGINES
    .ROCKET ENGINES
    .BOOSTER ROCKET ENGINES
    .M-1 ENGINE
    .LIQUID PROPELLANT ROCKET ENGINES
    .HYDROGEN OXYGEN ENGINES
    .M-1 ENGINE
    RT NOVA LAUNCH VEHICLES
      SATURN 1 LAUNCH VEHICLES
      SATURN 1B LAUNCH VEHICLES

M-2 LIFTING BODY
  0101 0103 3501
  GS LIFTING BODIES
    .LIFTING REENTRY VEHICLES
    .M-2 LIFTING BODY
    .M-2F2 LIFTING BODY
    REENTRY VEHICLES
    .MANEUVERABLE REENTRY BODIES
    .LIFTING REENTRY VEHICLES
    .M-2 LIFTING BODY
    .M-2F2 LIFTING BODY

M-2F2 LIFTING BODY
  0101 0102 0103 0104 0205
  GS LIFTING BODIES
    .LIFTING REENTRY VEHICLES
    .M-2 LIFTING BODY
    .M-2F2 LIFTING BODY

LYSOGENESIS
  0404 0409 0412
  RT DISINTEGRATION
    LYSINE

LYSOSOMES
  0404 0406 0409
  GS ORGANELLES
    #LYSOSOMES
    RT CELLS (BIOLOGY)
      CYTOLOGY
      ENZYME ACTIVITY
      LYSOZYME

LYSOZYME
  0403 1808
  GS BIOPOLYMERS
    .PROTEINS
    .ENZYMES
    .LYSOZYME
    ORGANIC COMPOUNDS
    .PROTEINS
    .ENZYMES
    .LYSOZYME
    RT BODY FLUIDS
      LYSOSOMES

LZEEBE SATELLITE
  3107
  UF EARTH ENERGY BUDGET EXPERIMENT
    LONG TERM ZONAL EARTH ENERGY
    EXPERIMENT
    ZONAL EARTH ENERGY BUDGET
    EXPERIMENT
    GS ARTIFICIAL SATELLITES
      .SCIENTIFIC SATELLITES
      .LZEEBE SATELLITE

M REGION
  1307 2902 3001
  GS REGIONS
    #M REGION
    RT GEOMAGNETISM
      SOLAR ATMOSPHERE
      SOLAR CORPUSCULAR RADIATION
      SOLAR WIND

```



[illegible]

ARGON LASERS  
 CARBON DIOXIDE LASERS  
 DIFFRACTOMETERS  
 GAS LASERS  
 GONIOMETERS  
 OPTICAL EQUIPMENT  
 OPTICAL MEASURING INSTRUMENTS  
 SCHLIEREN PHOTOGRAPHY  
  
 MACHINE LEARNING  
 O408 0502 3405  
 UF LEARNING MACHINES  
 GS AUTOMATIC CONTROL  
 .ADAPTIVE CONTROL  
 .#MACHINE LEARNING  
 RT ARTIFICIAL INTELLIGENCE  
 AUTOMATA THEORY  
 CYBERNETICS  
 FEEDBACK CONTROL  
 % MACHINERY  
 SELF ORGANIZING SYSTEMS  
 TEACHING MACHINES  
  
 MACHINE LIFE  
 USE SERVICE LIFE  
  
 MACHINE ORIENTED LANGUAGES  
 O802 0803  
 GS LANGUAGES  
 .PROGRAMMING LANGUAGES  
 .#MACHINE ORIENTED LANGUAGES  
 ..MARVS (PROGRAMMING LANGUAGE)  
 RT ALGOL  
 ASSEMBLY LANGUAGE  
 AUTOCODERS  
 LANGUAGE PROGRAMMING  
 PL/1  
  
 MACHINE RECOGNITION  
 USE ARTIFICIAL INTELLIGENCE  
  
 MACHINE STORAGE  
 USE COMPUTER STORAGE DEVICES  
 CORE STORAGE  
  
 MACHINE TOOLS  
 1504  
 GS TOOLS  
 #MACHINE TOOLS  
 ..BORING MACHINES  
 ..GRINDING MACHINES  
 ..LATHES  
 ...TURRET LATHES  
 ..MILLING MACHINES  
 ..SHAPERS

RT CUTTERS  
 DIES  
 DRILLS  
 % MACHINERY  
 MACHINING  
 MANDRELS  
 MECHANICAL DEVICES  
 MECHANICAL ENGINEERING  
 METAL CUTTING  
 NUMERICAL CONTROL  
 PRESSES  
 PUNCHES  
 SAWS  
 SHEARS  
 TAPS  
 ULTRASONIC CLEANING  
  
 MACHINE TRANSLATION  
 O802 0803  
 GS LINGUISTICS  
 #MACHINE TRANSLATION  
 TRANSLATING  
 #MACHINE TRANSLATION  
 COMPUTER PROGRAMS  
 INFORMATION THEORY  
 LANGUAGE PROGRAMMING  
 LANGUAGES  
 NATURAL LANGUAGE PROCESSING  
  
 MACHINE VISION  
 USE COMPUTER VISION  
  
 MACHINE-INDEPENDENT PROGRAMS  
 O802 0803  
 GS COMPUTER PROGRAMS  
 #MACHINE-INDEPENDENT PROGRAMS  
 RT COMPUTER PROGRAMMING  
 COMPUTERS  
 MULTIPROGRAMMING  
  
 % MACHINERY  
 O801 1504 3404  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT BORING MACHINES  
 COMPUTERS  
 DRAFTING MACHINES  
 ENGINES  
 FATIGUE TESTING MACHINES  
 GRINDING MACHINES  
 GROUND EFFECT MACHINES  
 IMPACT TESTING MACHINES  
 LEVERS  
 LOAD TESTING MACHINES

MACHINE LEARNING  
 MACHINE TOOLS  
 MECHANICAL ENGINEERING  
 % MECHANISM  
 MECHANIZATION  
 MILLING MACHINES  
 POSITIONING DEVICES (MACHINERY)  
 REFRIGERATING MACHINERY  
 % ROTATING ELECTRICAL MACHINES  
 SELF FOCUSING  
 TEACHING MACHINES  
 TIDE POWERED MACHINES  
 TOOLS  
 TURBOMACHINERY  
 TURING MACHINES  
 VIBRATION SIMULATORS  
 WALKING MACHINES  
 WATERWAVE POWERED MACHINES  
 WELDING MACHINES  
 WINDMILLS (WINDPOWERED MACHINES)

MACHINING  
 1504  
 UF MATERIAL REMOVAL (MACHINING)  
 GS #MACHINING  
 .CHEMICAL MACHINING  
 ..ELECTROCHEMICAL MACHINING  
 .HOT MACHINING  
 .MICROMACHINING  
 .MILLING (MACHINING)  
 .SPARK MACHINING  
 .ULTRASONIC MACHINING  
 RT % CUT-OFF  
 CUTTING  
 DRILLING  
 FINISHES  
 FORMING TECHNIQUES  
 GRINDING (MATERIAL REMOVAL)  
 GROOVING  
 KNURLING  
 LASER CUTTING  
 MACHINE TOOLS  
 METAL CUTTING  
 METAL WORKING  
 PLANING  
 RESIDUAL STRESS  
 SETUPS  
 SURFACE FINISHING  
 SURFACE ROUGHNESS  
 TOOLING  
 V GROOVES

MACINTOSH PC  
 USE MACINTOSH PERSONAL COMPUTERS



# NASA THESAURUS HIERARCHICAL UPDATE

## MACINTOSH PERSONAL COMPUTERS

0801 0802 0905 3502  
 UF MACINTOSH PC  
 GS DATA PROCESSING EQUIPMENT  
 . COMPUTERS  
 .. DIGITAL COMPUTERS  
 ... MICROCOMPUTERS  
 .... PERSONAL COMPUTERS  
 ..... #MACINTOSH PERSONAL COMPUTERS  
 RT COMPUTER GRAPHICS  
 COMPUTER PROGRAMS

## MACLAURIN SERIES

1902  
 UF MCLAURIN SERIES  
 GS ANALYSIS (MATHEMATICS)  
 . CALCULUS  
 .. SERIES (MATHEMATICS)  
 ... POWER SERIES  
 .... TAYLOR SERIES  
 ..... #MACLAURIN SERIES  
 . REAL VARIABLES  
 .. SERIES (MATHEMATICS)  
 ... POWER SERIES  
 .... TAYLOR SERIES  
 ..... #MACLAURIN SERIES

## MACROCLIMATE

USE CLIMATE

## MACROMOLECULES

0603 2401 2404 2405 2502 2603  
 GS MOLECULES  
 #MACROMOLECULES  
 RT MOLECULAR CHAINS  
 MOLECULAR STRUCTURE  
 MOLECULAR WEIGHT  
 % POLYMERS  
 PROTEINS

## MACROPHAGES

0404 0407  
 GS CELLS (BIOLOGY)  
 #MACROPHAGES  
 RT TISSUES (BIOLOGY)

## MACROSCOPIC EQUATIONS

0602 0603 1902  
 RT % EQUATIONS  
 % MEASUREMENT  
 % PROPERTIES  
 STATISTICAL MECHANICS

## MACULAR VISION

USE VISION

## MADAGASCAR

1305  
 UF MALAGASY REPUBLIC  
 GS LANDFORMS  
 . ISLANDS  
 . #MADAGASCAR  
 NATIONS  
 #MADAGASCAR  
 RT AFRICA  
 INDIAN OCEAN

## MAFFEI GALAXIES

3001  
 GS CELESTIAL BODIES  
 . GALAXIES  
 . #MAFFEI GALAXIES  
 RT NEBULAE  
 RADIO ASTRONOMY  
 RADIO GALAXIES  
 RADIO SOURCES (ASTRONOMY)  
 SPIRAL GALAXIES

## MAGAZINES (SUPPLY CHAMBERS)

1504 3401  
 RT AMMUNITION  
 PHOTOGRAPHIC FILM  
 SPOOLS

## MAGDALENA-CAUCA VALLEY (COLOMBIA)

1305  
 GS LANDFORMS  
 #MAGDALENA-CAUCA VALLEY (COLOMBIA)  
 VALLEYS  
 #MAGDALENA-CAUCA VALLEY (COLOMBIA)  
 RT COLOMBIA  
 SOUTH AMERICA

## MAGELLAN MISSION (ESA)

USE MAGELLAN ULTRAVIOLET ASTRONOMY  
 SATELLITE

## MAGELLAN PROJECT (NASA)

3108 3007  
 SN (DOES NOT INCLUDE THE MAGELLAN  
 ULTRAVIOLET ASTRONOMY SATELLITE)  
 UF VENUS RADAR MAPPER PROJECT  
 GS PROGRAMS

. NASA PROGRAMS  
 . . NASA SPACE PROGRAMS  
 . . #MAGELLAN PROJECT (NASA)  
 . PROJECTS  
 . #MAGELLAN PROJECT (NASA)  
 . SPACE PROGRAMS  
 . . NASA SPACE PROGRAMS

RT . . #MAGELLAN PROJECT (NASA)  
 MAGELLAN SPACECRAFT (NASA)  
 SPACE EXPLORATION  
 SPACE MISSIONS  
 VENUS ORBITING IMAGING RADAR  
 (SPACECRAFT)  
 VENUS PROBES  
 VENUS SURFACE

## MAGELLAN SPACECRAFT (NASA)

3108 3007  
 SN (DOES NOT INCLUDE THE MAGELLAN  
 ULTRAVIOLET ASTRONOMY SATELLITE)  
 UF VENUS RADAR MAPPER  
 GS INTERPLANETARY SPACECRAFT  
 . VENUS PROBES  
 . #MAGELLAN SPACECRAFT (NASA)  
 UNMANNED SPACECRAFT  
 . SPACE PROBES  
 . . VENUS PROBES  
 . . #MAGELLAN SPACECRAFT (NASA)  
 RT MAGELLAN PROJECT (NASA)  
 RADAR IMAGERY  
 % SPACECRAFT  
 SYNTHETIC APERTURE RADAR  
 VENUS ORBITING IMAGING RADAR  
 (SPACECRAFT)  
 VENUS SURFACE

## MAGELLAN ULTRAVIOLET ASTRONOMY SATELLITE

3001  
 UF MAGELLAN MISSION (ESA)  
 GS ARTIFICIAL SATELLITES  
 . ESA SATELLITES  
 . #MAGELLAN ULTRAVIOLET ASTRONOMY  
 SATELLITE  
 ESA SPACECRAFT  
 . ESA SATELLITES  
 . #MAGELLAN ULTRAVIOLET ASTRONOMY  
 SATELLITE  
 OBSERVATORIES  
 . ASTRONOMICAL OBSERVATORIES  
 . . ASTRONOMICAL SATELLITES  
 . . #MAGELLAN ULTRAVIOLET ASTRONOMY  
 SATELLITE  
 RT EXTREME ULTRAVIOLET RADIATION  
 FAR ULTRAVIOLET RADIATION  
 SPACEBORNE ASTRONOMY

## MAGELLANIC CLOUDS

3001 3003 3009  
 GS CELESTIAL BODIES  
 . GALAXIES  
 . #MAGELLANIC CLOUDS  
 RT % CLOUDS

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

## MAGNESIUM SULFATES

1804  
GS MAGNESIUM COMPOUNDS  
#MAGNESIUM SULFATES  
..HEXAHEDRITE  
SULFUR COMPOUNDS  
SULFATES  
..#MAGNESIUM SULFATES  
..HEXAHEDRITE  
RT BLOEDITE

## MAGNESIUM TITANATES

O603 1804  
GS MAGNESIUM COMPOUNDS  
#MAGNESIUM TITANATES  
TITANIUM COMPOUNDS  
..TITANATES  
..#MAGNESIUM TITANATES

## MAGNESYN (TRADEMARK) USE SERVOMOTORS

MAGNET COILS  
O904 2305 2307 2402  
GS ELECTRIC COILS  
.MAGNETIC COILS  
..#MAGNET COILS

## RT % COILS

ELECTROMAGNETISM  
ELECTROMAGNETS  
FIELD COILS  
INDUCTORS  
MAGNETIC CIRCUITS  
MAGNETIC CORES  
MAGNETIC ENERGY STORAGE  
MAGNETS  
SATURABLE REACTORS  
SOLENOIDS  
SUPERCONDUCTING MAGNETS  
TOROIDS  
TRANSFORMERS  
WIRE WINDING  
YOKES

## MAGNETIC ABSORPTION

USE ELECTROMAGNETIC ABSORPTION

## MAGNETIC AMPLIFIERS

O904 2307  
GS AMPLIFIERS  
#MAGNETIC AMPLIFIERS  
RT MAGNETOSTATIC AMPLIFIERS  
NONLINEARITY  
POWER AMPLIFIERS  
SATURABLE REACTORS

## VOLTAGE AMPLIFIERS

MAGNETIC ANNULAR ARC  
2307 2501  
RT % ARCS  
CURRENT DISTRIBUTION  
PLASMA ACCELERATORS  
PLASMA CONTROL  
PLASMA PROPULSION

## MAGNETIC ANNULAR SHOCK TUBES

2307 2311  
UF MAST SHOCK TUBES  
GS SHOCK WAVE GENERATORS  
.SHOCK TUBES  
..MAGNETIC ANNULAR SHOCK TUBES

## MAGNETIC ANOMALIES

2307 2311 2402  
UF GEOMAGNETIC ANOMALIES  
GS ANOMALIES  
#MAGNETIC ANOMALIES  
..GEOMAGNETIC HOLLOW  
RT AEROMAGNETISM  
GEOMAGNETISM  
NONUNIFORM MAGNETIC FIELDS

## MAGNETIC BEARINGS

1501  
GS BEARINGS  
#MAGNETIC BEARINGS  
RT LEVITATION  
MAGNETIC SUSPENSION

## MAGNETIC CHARGE DENSITY

2307  
UF SCALAR MAGNETIC CHARGE  
GS DIVERGENCE  
#MAGNETIC CHARGE DENSITY  
RT % CHARGING  
CONSTITUTIVE EQUATIONS  
MAXWELL EQUATION

## MAGNETIC CIRCUITS

O902 2307 2402  
GS CIRCUITS  
#MAGNETIC CIRCUITS  
RT FLUX (RATE)  
LINES OF FORCE  
MAGNET COILS  
% NETWORKS  
SATURABLE REACTORS  
TRANSFORMERS

## MAGNETIC CLOUDS

## 2502 2902

GS #MAGNETIC FIELDS  
#MAGNETIC CLOUDS  
PARTICLES  
.CHARGED PARTICLES  
..PLASMA CLOUDS  
..#MAGNETIC CLOUDS  
RT % CLOUDS  
INTERPLANETARY MAGNETIC FIELDS  
INTERPLANETARY MEDIUM  
INTERSTELLAR GAS  
INTERSTELLAR MAGNETIC FIELDS  
MAGNETIC FIELD CONFIGURATIONS  
SOLAR CORONA  
SOLAR WIND  
STELLAR MASS EJECTION

## MAGNETIC COILS

O904 2305 2307  
GS ELECTRIC COILS  
#MAGNETIC COILS  
..FIELD COILS  
..MAGNET COILS  
RT % COILS  
ELECTROMAGNETIC HAMMERS  
ELECTROMAGNETISM  
FLUX PUMPS

## MAGNETIC COMPASSES

2104 2307  
GS MEASURING INSTRUMENTS  
.INDICATING INSTRUMENTS  
..COMPASSES  
..#MAGNETIC COMPASSES  
NAVIGATION AIDS  
.NAVIGATION INSTRUMENTS  
..COMPASSES  
..#MAGNETIC COMPASSES  
RT GYROCOMPASSES  
SOLAR COMPASSES

## MAGNETIC COMPRESSION

2307  
RT COMPRESSING  
CONFINEMENT  
PLASMA CONTROL  
PLASMAS (PHYSICS)

## MAGNETIC CONTROL

O904 2307  
RT ATTITUDE CONTROL  
% CONTROL

## MAGNETIC COOLING

1202

GS COOLING  
 #MAGNETIC COOLING  
 RT ABSORPTION COOLING  
 ADIABATIC DEMAGNETIZATION COOLING  
 LOW TEMPERATURE  
 LOW TEMPERATURE ENVIRONMENTS  
 REFRIGERATING

MAGNETIC CORES  
 0904 2305 2307  
 GS COMPUTER STORAGE DEVICES  
 #MAGNETIC CORES  
 CORES  
 #MAGNETIC CORES  
 BUBBLE MEMORY DEVICES  
 ELECTRIC COILS  
 FERRITES  
 FERROMAGNETISM  
 LAMINATES  
 MAGNET COILS  
 MAGNETS  
 PARAMETRONS  
 SATURABLE REACTORS  
 TOROIDS  
 TRANSFORMERS

MAGNETIC DIFFUSION  
 2307 2311  
 SN (DIFFUSION VIA A MAGNETIC FIELD)  
 GS DIFFUSION  
 #MAGNETIC DIFFUSION  
 RT FIELD STRENGTH

MAGNETIC DIPOLES  
 2307 2311 2402  
 RT % DIPOLES  
 ELECTRIC DIPOLES  
 % PHYSICAL PROPERTIES  
 % POLES

MAGNETIC DISKS  
 0801 2305 2307 9001  
 GS COMPUTER STORAGE DEVICES  
 #MAGNETIC DISKS  
 MAGNETIC STORAGE  
 #MAGNETIC DISKS  
 RT CORE STORAGE  
 DISK OPERATING SYSTEM (DOS)  
 % DISKS  
 MEMORY (COMPUTERS)  
 PERIPHERAL EQUIPMENT (COMPUTERS)  
 VIDEO DISKS

MAGNETIC DISPERSION  
 0710 2307 2402

RT % DISPERSION  
 ELECTROMAGNETIC SCATTERING  
 FERROMAGNETISM  
 MAGNETIZATION  
 WAVE SCATTERING

MAGNETIC DISTURBANCES  
 2307 2402  
 GS #MAGNETIC DISTURBANCES  
 -MAGNETIC STORMS  
 RT AURORAS  
 BIRKELAND CURRENTS  
 % DISTURBANCES  
 GEOMAGNETISM  
 KP INDEX  
 NONADIABATIC THEORY  
 SOLAR ACTIVITY  
 SOLAR ACTIVITY EFFECTS  
 SOLAR FLARES  
 SOLAR PLANETARY INTERACTIONS  
 SOLAR TERRESTRIAL INTERACTIONS  
 SOLAR WIND VELOCITY  
 STARSPTS  
 STELLAR ACTIVITY  
 SUDEN IONOSPHERIC DISTURBANCES  
 SUDDEN STORM COMMENCEMENTS  
 SUNSPOTS

MAGNETIC DOMAINS  
 2307 2405  
 GS DOMAINS  
 #MAGNETIC DOMAINS  
 RT BUBBLE MEMORY DEVICES  
 BUBBLE TECHNIQUE  
 DIPOLE MOMENTS  
 DOMAIN WALL  
 LINES OF FORCE

MAGNETIC DRUMS  
 0801 2305 2307  
 GS COMPUTER STORAGE DEVICES  
 #MAGNETIC DRUMS  
 MAGNETIC STORAGE  
 #MAGNETIC DRUMS  
 RT CORE STORAGE  
 % DRUMS

MAGNETIC EFFECTS  
 2307 2311  
 UF GEOMAGNETIC EFFECTS  
 GS MAGNETIC PROPERTIES  
 #MAGNETIC EFFECTS  
 ..MAGNETIC RIGIDITY  
 RT % EFFECTS  
 FLUX TRANSFER EVENTS

GEOMAGNETISM  
 MAGNETOACTIVITY  
 PLASMA COMPRESSION  
 TEMPERATURE EFFECTS

MAGNETIC ENERGY STORAGE  
 2304  
 GS ENERGY STORAGE  
 #MAGNETIC ENERGY STORAGE  
 RT ENERGY TECHNOLOGY  
 MAGNET COILS  
 MAGNETIC FIELDS  
 SUPERCONDUCTING MAGNETS

MAGNETIC EQUATOR  
 1307 2103 2307  
 UF GEOMAGNETIC EQUATOR  
 GS EQUATORS  
 #MAGNETIC EQUATOR  
 RT GEOMAGNETISM  
 % INCLINATION

MAGNETIC FIELD CONFIGURATIONS  
 0904 0905 3009  
 RT ASTROPHYSICS  
 ELECTROMAGNETIC FIELDS  
 FLUX TRANSFER EVENTS  
 FORCE-FREE MAGNETIC FIELDS  
 HELICAL WINDINGS  
 MAGNETIC CLOUDS  
 MAGNETIC FIELD RECONNECTION  
 PLASMA COMPRESSION  
 PLASMA CONTROL  
 PLASMA PHYSICS  
 POLAR CUSPS  
 POLOIDAL FLUX  
 SPHEROMAKS  
 STELLAR MAGNETIC FIELDS

MAGNETIC FIELD INTENSITY  
 USE MAGNETIC FLUX

MAGNETIC FIELD INVERSIONS  
 1307 2307 2311 2402  
 GS INVERSIONS  
 #MAGNETIC FIELD INVERSIONS  
 RT ELECTROMAGNETIC FIELDS  
 ELECTROMAGNETISM  
 ELECTROMECHANICS  
 FIELD THEORY (PHYSICS)

MAGNETIC FIELD RECONNECTION  
 1307 2502 3002  
 GS MAGNETIC PROPERTIES  
 .MAGNETOACTIVITY

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                        |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                      | #MAGNETIC FIELD RECONNECTION<br>FIELD ALIGNED CURRENTS<br>FLUX TRANSFER EVENTS<br>INTERPLANETARY MAGNETIC FIELDS<br>MAGNETIC FIELD CONFIGURATIONS<br>MAGNETIC FIELDS<br>MAGNETIC FLUX<br>MAGNETOSPHERE-IONOSPHERE COUPLING<br>SOLAR MAGNETIC FIELD<br>SPACE PLASMAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MAGNETIC FIELD RECONNECTION<br>MAGNETIZATION<br>MAGNETO-OPTICS<br>MAGNETOACTIVITY<br>MAGNETOPLASMADYNAMICS<br>MAGNETORESISTIVITY<br>MAGNETOSTATICS<br>MAGNETS<br>MULTIPOLAR FIELDS<br>NONTHERMAL RADIATION<br>PARTICLE ACCELERATION<br>PINCH EFFECT<br>POLAR CUSPS<br>POLARITY<br>PULSAR MAGNETOSPHERES<br>RACETRACKS (PARTICLE ACCELERATORS)<br>RADIATION BELTS<br>SCREW PINCH<br>SCYLLA<br>SELF CONSISTENT FIELDS<br>SQUARE WELLS<br>STELLAR MAGNETOSPHERES<br>SUHL EFFECT<br>ZEEMAN EFFECT | #MAGNETIC FORMING<br>BULGING<br>COLD WORKING<br>DEEP DRAWING<br>ELECTROMAGNETIC HAMMERS<br>METAL DRAWING                                                                                               |
| MAGNETIC FIELDS<br>1307 2304 2305 2307 2501 3009<br>GS #MAGNETIC FIELDS | .BIOMAGNETISM<br>.FORCE-FREE MAGNETIC FIELDS<br>.GEOMAGNETISM<br>.INTERPLANETARY MAGNETIC FIELDS<br>.INTERSTELLAR MAGNETIC FIELDS<br>.LUNAR MAGNETIC FIELDS<br>.MAGNETIC CLOUDS<br>.MAGNETOSTATIC FIELDS<br>.NONUNIFORM MAGNETIC FIELDS<br>.PALEOMAGNETISM<br>.PLANETARY MAGNETIC FIELDS<br>.STELLAR MAGNETIC FIELDS<br>..SOLAR MAGNETIC FIELD<br>.TRAPPED MAGNETIC FIELDS<br>BERNSTEIN ENERGY PRINCIPLE<br>BETA FACTOR<br>CONJUGATE POINTS<br>CONSTITUTIVE EQUATIONS<br>CROSSED FIELDS<br>DEMAGNETIZATION<br>EARTH MAGNETOSPHERE<br>ELECTRIC FIELDS<br>ELECTROMAGNETIC ACCELERATION<br>ELECTROMAGNETIC FIELDS<br>ELECTROMAGNETISM<br>ELECTROMECHANICS<br>ELECTRON-HOLE DROPS<br>FERROMAGNETIC RESONANCE<br>FIELD EMISSION<br>FIELD STRENGTH<br>FIELD THEORY (PHYSICS)<br>% FIELDS<br>FLUX PUMPS<br>FLUX TRANSFER EVENTS<br>GEOMAGNETIC TAIL<br>HELIOS SATELLITES<br>INTASAT SATELLITE<br>% KERR EFFECTS<br>LINES OF FORCE<br>LORENTZ FORCE<br>MAGNETIC ENERGY STORAGE | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC INDUCTION<br>2307 2311 2402<br>UF ELECTROMAGNETIC DEDUCTION<br>GS #MAGNETIC PROPERTIES<br>#MAGNETIC INDUCTION<br>RT COUPLING COEFFICIENTS<br>FLUX (RATE)<br>INDUCTANCE<br>% INDUCTION HEATING |
| RT                                                                      | MAGNETIC FORMING<br>0802 2307 2402<br>GS FORMING TECHNIQUES<br>#MAGNETIC FORMING<br>METAL WORKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC FORMING<br>BULGING<br>COLD WORKING<br>DEEP DRAWING<br>ELECTROMAGNETIC HAMMERS<br>METAL DRAWING                                                                                                |
| MAGNETIC FIELDS<br>1307 2304 2305 2307 2501 3009<br>GS #MAGNETIC FIELDS | .BIOMAGNETISM<br>.FORCE-FREE MAGNETIC FIELDS<br>.GEOMAGNETISM<br>.INTERPLANETARY MAGNETIC FIELDS<br>.INTERSTELLAR MAGNETIC FIELDS<br>.LUNAR MAGNETIC FIELDS<br>.MAGNETIC CLOUDS<br>.MAGNETOSTATIC FIELDS<br>.NONUNIFORM MAGNETIC FIELDS<br>.PALEOMAGNETISM<br>.PLANETARY MAGNETIC FIELDS<br>.STELLAR MAGNETIC FIELDS<br>..SOLAR MAGNETIC FIELD<br>.TRAPPED MAGNETIC FIELDS<br>BERNSTEIN ENERGY PRINCIPLE<br>BETA FACTOR<br>CONJUGATE POINTS<br>CONSTITUTIVE EQUATIONS<br>CROSSED FIELDS<br>DEMAGNETIZATION<br>EARTH MAGNETOSPHERE<br>ELECTRIC FIELDS<br>ELECTROMAGNETIC ACCELERATION<br>ELECTROMAGNETIC FIELDS<br>ELECTROMAGNETISM<br>ELECTROMECHANICS<br>ELECTRON-HOLE DROPS<br>FERROMAGNETIC RESONANCE<br>FIELD EMISSION<br>FIELD STRENGTH<br>FIELD THEORY (PHYSICS)<br>% FIELDS<br>FLUX PUMPS<br>FLUX TRANSFER EVENTS<br>GEOMAGNETIC TAIL<br>HELIOS SATELLITES<br>INTASAT SATELLITE<br>% KERR EFFECTS<br>LINES OF FORCE<br>LORENTZ FORCE<br>MAGNETIC ENERGY STORAGE | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC INDUCTION<br>2307 2311 2402<br>UF ELECTROMAGNETIC DEDUCTION<br>GS #MAGNETIC PROPERTIES<br>#MAGNETIC INDUCTION<br>RT COUPLING COEFFICIENTS<br>FLUX (RATE)<br>INDUCTANCE<br>% INDUCTION HEATING |
| RT                                                                      | MAGNETIC FORMING<br>0802 2307 2402<br>GS FORMING TECHNIQUES<br>#MAGNETIC FORMING<br>METAL WORKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC FORMING<br>BULGING<br>COLD WORKING<br>DEEP DRAWING<br>ELECTROMAGNETIC HAMMERS<br>METAL DRAWING                                                                                                |
| MAGNETIC FIELDS<br>1307 2304 2305 2307 2501 3009<br>GS #MAGNETIC FIELDS | .BIOMAGNETISM<br>.FORCE-FREE MAGNETIC FIELDS<br>.GEOMAGNETISM<br>.INTERPLANETARY MAGNETIC FIELDS<br>.INTERSTELLAR MAGNETIC FIELDS<br>.LUNAR MAGNETIC FIELDS<br>.MAGNETIC CLOUDS<br>.MAGNETOSTATIC FIELDS<br>.NONUNIFORM MAGNETIC FIELDS<br>.PALEOMAGNETISM<br>.PLANETARY MAGNETIC FIELDS<br>.STELLAR MAGNETIC FIELDS<br>..SOLAR MAGNETIC FIELD<br>.TRAPPED MAGNETIC FIELDS<br>BERNSTEIN ENERGY PRINCIPLE<br>BETA FACTOR<br>CONJUGATE POINTS<br>CONSTITUTIVE EQUATIONS<br>CROSSED FIELDS<br>DEMAGNETIZATION<br>EARTH MAGNETOSPHERE<br>ELECTRIC FIELDS<br>ELECTROMAGNETIC ACCELERATION<br>ELECTROMAGNETIC FIELDS<br>ELECTROMAGNETISM<br>ELECTROMECHANICS<br>ELECTRON-HOLE DROPS<br>FERROMAGNETIC RESONANCE<br>FIELD EMISSION<br>FIELD STRENGTH<br>FIELD THEORY (PHYSICS)<br>% FIELDS<br>FLUX PUMPS<br>FLUX TRANSFER EVENTS<br>GEOMAGNETIC TAIL<br>HELIOS SATELLITES<br>INTASAT SATELLITE<br>% KERR EFFECTS<br>LINES OF FORCE<br>LORENTZ FORCE<br>MAGNETIC ENERGY STORAGE | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC INDUCTION<br>2307 2311 2402<br>UF ELECTROMAGNETIC DEDUCTION<br>GS #MAGNETIC PROPERTIES<br>#MAGNETIC INDUCTION<br>RT COUPLING COEFFICIENTS<br>FLUX (RATE)<br>INDUCTANCE<br>% INDUCTION HEATING |
| RT                                                                      | MAGNETIC FORMING<br>0802 2307 2402<br>GS FORMING TECHNIQUES<br>#MAGNETIC FORMING<br>METAL WORKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC FORMING<br>BULGING<br>COLD WORKING<br>DEEP DRAWING<br>ELECTROMAGNETIC HAMMERS<br>METAL DRAWING                                                                                                |
| MAGNETIC FIELDS<br>1307 2304 2305 2307 2501 3009<br>GS #MAGNETIC FIELDS | .BIOMAGNETISM<br>.FORCE-FREE MAGNETIC FIELDS<br>.GEOMAGNETISM<br>.INTERPLANETARY MAGNETIC FIELDS<br>.INTERSTELLAR MAGNETIC FIELDS<br>.LUNAR MAGNETIC FIELDS<br>.MAGNETIC CLOUDS<br>.MAGNETOSTATIC FIELDS<br>.NONUNIFORM MAGNETIC FIELDS<br>.PALEOMAGNETISM<br>.PLANETARY MAGNETIC FIELDS<br>.STELLAR MAGNETIC FIELDS<br>..SOLAR MAGNETIC FIELD<br>.TRAPPED MAGNETIC FIELDS<br>BERNSTEIN ENERGY PRINCIPLE<br>BETA FACTOR<br>CONJUGATE POINTS<br>CONSTITUTIVE EQUATIONS<br>CROSSED FIELDS<br>DEMAGNETIZATION<br>EARTH MAGNETOSPHERE<br>ELECTRIC FIELDS<br>ELECTROMAGNETIC ACCELERATION<br>ELECTROMAGNETIC FIELDS<br>ELECTROMAGNETISM<br>ELECTROMECHANICS<br>ELECTRON-HOLE DROPS<br>FERROMAGNETIC RESONANCE<br>FIELD EMISSION<br>FIELD STRENGTH<br>FIELD THEORY (PHYSICS)<br>% FIELDS<br>FLUX PUMPS<br>FLUX TRANSFER EVENTS<br>GEOMAGNETIC TAIL<br>HELIOS SATELLITES<br>INTASAT SATELLITE<br>% KERR EFFECTS<br>LINES OF FORCE<br>LORENTZ FORCE<br>MAGNETIC ENERGY STORAGE | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC INDUCTION<br>2307 2311 2402<br>UF ELECTROMAGNETIC DEDUCTION<br>GS #MAGNETIC PROPERTIES<br>#MAGNETIC INDUCTION<br>RT COUPLING COEFFICIENTS<br>FLUX (RATE)<br>INDUCTANCE<br>% INDUCTION HEATING |
| RT                                                                      | MAGNETIC FORMING<br>0802 2307 2402<br>GS FORMING TECHNIQUES<br>#MAGNETIC FORMING<br>METAL WORKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MAGNETIC LENSES<br>2307<br>UF QUADRUPOLE LENSES<br>GS LENSES<br>RT #MAGNETIC LENSES<br>CATHODE RAY TUBES<br>ELECTRON BEAMS<br>ELECTRON GUNS<br>ELECTRON MICROSCOPES<br>ELECTRON MICROSCOPY<br>PLASMA GUNS<br>PLASMA JETS<br>SCANNING ELECTRON MICROSCOPY<br>TRANSMISSION ELECTRON MICROSCOPY<br>WIRE GRID LENSES                                                                                                                                                                              | MAGNETIC FORMING<br>BULGING<br>COLD WORKING<br>DEEP DRAWING<br>ELECTROMAGNETIC HAMMERS<br>METAL DRAWING                                                                                                |
| MAGNETIC FIELDS<br>1307 2304 2305 2307 2501 3009<br>GS #MAGNETIC FIELDS | .BIOMAGNETISM<br>.FORCE-FREE MAGNETIC FIELDS<br>.GEOMAGNETISM<br>.INTERPLANETARY MAGNETIC FIELDS<br>.INTERSTELLAR MAGNETIC FIELDS<br>.LUNAR MAGNETIC FIELDS<br>.MAGNETIC CLOUDS<br>.MAGNETOSTATIC FIELDS<br>.NONUNIFORM MAGNETIC FIELDS<br>.PALEOMAGNETISM<br>.PLANETARY MAGNETIC FIELDS<br>.STELLAR MAGNETIC FIELDS<br>..SOLAR MAGNETIC FIELD<br>.TRAPPED MAGNETIC FIELDS<br>BERNSTEIN ENERGY PRINCIPLE<br>BETA FACTOR<br>CONJUGATE POINTS<br>CONSTITUTIVE EQUATIONS<br>CROSSED FIELDS<br>DEMAGNETIZATION<br>EARTH MAGNETOSPHERE<br>ELECTRIC FIELDS<br>ELECTROMAGNETIC ACCELERATION<br>ELECTROMAGNETIC FIELDS<br>ELECTROMAGNETISM<br>ELECTROMECHANICS<br>ELECTRON-HOLE DROPS<br>FERROMAGNETIC RESONANCE<br>FIELD EMISSION<br>FIELD STRENGTH<br>FIELD THEORY (PHYSICS)<br>% FIELDS<br>FLUX PUMPS<br>FLUX                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                        |

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..FERROMAGNETIC FILMS
..MAGNETITE
..PERMALLOYS (TRADEMARK)
RT KONDO EFFECT
  MAGNETS
  % MATERIALS
  PERMANENT MAGNETS

MAGNETIC MEASUREMENT
1308 1406 2307 3501
SN (MEASUREMENT OF MAGNETIC
  PROPERTIES, QUANTITIES OR
  CONDITIONS)
UF FLUXMETERS
RT ELECTROMAGNETIC MEASUREMENT
  MAGNETOMETERS
  % MATERIALS TESTS
  % MEASUREMENT
  SQUID (DETECTORS)

MAGNETIC MEMORIES
USE MAGNETIC STORAGE

MAGNETIC METALS
USE MAGNETIC MATERIALS
  METALS

MAGNETIC MIRRORS
2307 2502
GS MIRRORS
  #MAGNETIC MIRRORS
  ..TANDEM MIRRORS
  LINES OF FORCE
  MIRROR FUSION
  MIRROR POINT
  NONUNIFORM MAGNETIC FIELDS
  NUCLEAR FUSION
  PLASMA CONTROL
  PLASMA EQUILIBRIUM
  Q DEVICES
  SCYLLA
  SPHEROMAKS

MAGNETIC MOMENTS
2307 2311 3408
GS MAGNETIC PROPERTIES
  #MAGNETIC MOMENTS
  MOMENTS
  .DIPOLE MOMENTS
  .#MAGNETIC MOMENTS
  BOHR MAGNETON
  ELECTRIC MOMENTS
  LANGEVIN FORMULA
  QUENCHING (ATOMIC PHYSICS)

MAGNETIC MONOPOLES
0603
GS MONOPOLES
  #MAGNETIC MONOPOLES
  PARTICLES
  .ELEMENTARY PARTICLES
  .#MAGNETIC MONOPOLES
RT QUANTUM THEORY

MAGNETIC PERMEABILITY
2307
UF MAGNETIC SUSCEPTIBILITY
  SUSCEPTIBILITY (MAGNETISM)
GS MAGNETIC PROPERTIES
  #MAGNETIC PERMEABILITY
  CURIE-WEISS LAW
  DIELECTRIC PERMEABILITY
  HYSTERESIS
  NEEL TEMPERATURE
  RELUCTANCE

MAGNETIC PISTONS
0904 2307
GS PISTONS
  #MAGNETIC PISTONS
RT HYPERSONIC WIND TUNNELS
  HYPERVELOCITY WIND TUNNELS
  SHOCK TUBES
  SHOCK WAVE GENERATORS

MAGNETIC POLES
2307
RT AURORAL ZONES
  % DIPOLES
  GEOMAGNETISM
  POLARITY
  % POLES

MAGNETIC PROBES
0710 1302 2307 3108
UF MAGNETIC INDUCTION PROBES
GS MEASURING INSTRUMENTS
  #MAGNETIC PROBES
RT MAGNETOMETERS
  RESONANCE PROBES
  SPACE PROBES

MAGNETIC PROPERTIES
2307 2311 3408
GS #MAGNETIC PROPERTIES
  .ANTIFERROMAGNETISM
  .BIOMAGNETISM
  .CURIE TEMPERATURE
  .DIAMAGNETISM

..FERRIMAGNETISM
..FERROMAGNETISM
..GEOMAGNETISM
..GYROMAGNETISM
..GYROFREQUENCY
..MAGNETIC EFFECTS
..MAGNETIC RIGIDITY
..MAGNETIC INDUCTION
..MAGNETIC MOMENTS
..MAGNETIC PERMEABILITY
..MAGNETIC RELAXATION
..SPIN-LATTICE RELAXATION
..MAGNETIC SUSPENSION
..MAGNETOACOUSTICS
..MAGNETOACTIVITY
..FLUX TRANSFER EVENTS
..MAGNETIC FIELD RECONNECTION
..MAGNETORESISTIVITY
..MAGNETOSTRICTION
..PALEOMAGNETISM
..PARAMAGNETISM
..POLARIZATION CHARACTERISTICS
..RELUCTANCE
..REMANENCE
..THERMOMAGNETIC EFFECTS
COERCIVITY
CURIE-WEISS LAW
DIPOLE MOMENTS
EDDY CURRENTS
ELECTRICAL PROPERTIES
ELECTROMAGNETIC PROPERTIES
ELECTROMAGNETISM
FERRITIC STAINLESS STEELS
FIELD STRENGTH
HYSTERESIS
INDUCTANCE
KP INDEX
LINES OF FORCE
MAGNETIZATION
MAGNETOMECHANICS (PHYSICS)
MAGNETS
MAXWELL EQUATION
% PHYSICAL PROPERTIES
POLARIZATION (SPIN ALIGNMENT)
% PROPERTIES
% SOLID STATE PHYSICS
SPIN GLASS

MAGNETIC PUMPING
0710 2307 2402
RT ELECTRON CYCLOTRON HEATING
  INDUCTION HEATING
  ION CYCLOTRON RADIATION
  KINETIC HEATING
  PLASMA HEATING

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# NASA THESAURUS HIERARCHICAL UPDATE

## % PUMPING

MAGNETIC RECORDING  
 0905 2305 2307 9001  
 UF MAGNETIC TAPE RECORDERS  
 GS RECORDING  
 #MAGNETIC RECORDING  
 RT BUBBLE MEMORY DEVICES  
 DATA RECORDING  
 RECORDING HEADS

MAGNETIC RELAXATION  
 2305 2307 2311  
 GS MAGNETIC PROPERTIES  
 #MAGNETIC RELAXATION  
 ..SPIN-LATTICE RELAXATION  
 RT RELAXATION (MECHANICS)

MAGNETIC RESONANCE  
 1411 2305 2307 2405  
 GS RESONANCE  
 #MAGNETIC RESONANCE  
 ..FERROMAGNETIC RESONANCE  
 ..NUCLEAR MAGNETIC RESONANCE  
 ...PROTON MAGNETIC RESONANCE  
 ...PROTON RESONANCE  
 ...PARAMAGNETIC RESONANCE  
 ...ELECTRON PARAMAGNETIC RESONANCE  
 RT NUCLEAR SPIN  
 OVERHAUSER EFFECT  
 SPECTRUM ANALYSIS

MAGNETIC RIGIDITY  
 2307 2311  
 UF GYROINTERACTION  
 GS MAGNETIC PROPERTIES  
 .MAGNETIC EFFECTS  
 .#MAGNETIC RIGIDITY  
 RT ELECTRON TRAJECTORIES  
 IONOSPHERIC DRIFT  
 PARTICLE MASS  
 PARTICLE MOTION  
 % RIGIDITY

MAGNETIC SHIELDING  
 0904 2307 2311  
 GS SHIELDING  
 #MAGNETIC SHIELDING  
 RT ELECTROMAGNETIC SHIELDING  
 MAGNETOMETERS  
 RADIATION SHIELDING

MAGNETIC SIGNALS  
 2303 2307 2402  
 RT NUCLEAR MAGNETIC RESONANCE

## SIGNAL MIXING % SIGNALS

MAGNETIC SIGNATURES  
 2307  
 UF MAGNETOGRAMS  
 GS SIGNATURES  
 #MAGNETIC SIGNATURES  
 RT PATTERN REGISTRATION

MAGNETIC SPECTROSCOPY  
 1411 2307  
 GS SPECTROSCOPY  
 #MAGNETIC SPECTROSCOPY  
 RT GAS SPECTROSCOPY  
 MASS SPECTROSCOPY  
 SPECTROSCOPIC ANALYSIS  
 VACUUM SPECTROSCOPY

MAGNETIC STARS  
 3001 3009  
 GS CELESTIAL BODIES  
 .STARS  
 .#MAGNETIC STARS  
 RT PECULIAR STARS

MAGNETIC STORAGE  
 0802 2307  
 UF MAGNETIC MEMORIES  
 GS #MAGNETIC STORAGE  
 .BUBBLE MEMORY DEVICES  
 .CORE STORAGE  
 .MAGNETIC DISKS  
 .MAGNETIC DRUMS  
 RT COMPUTER STORAGE DEVICES  
 DATA RECORDING  
 DATA STORAGE  
 % DRUMS  
 % STORAGE  
 % VIRTUAL MEMORY SYSTEMS

MAGNETIC STORMS  
 0710 1302 2307 3009  
 UF GEOMAGNETIC STORMS  
 MAGNETIC SUBSTORMS  
 GS MAGNETIC DISTURBANCES  
 #MAGNETIC STORMS  
 STORMS

#MAGNETIC STORMS  
 RT BIRKELAND CURRENTS  
 DAWN CHORUS  
 FORBUSH DECREASES  
 NOISE STORMS  
 SOLAR STORMS

SOLAR TERRESTRIAL INTERACTIONS  
 SPREAD F  
 SUDDEN IONOSPHERIC DISTURBANCES  
 SUDDEN STORM COMMENCEMENTS

MAGNETIC SUBSTORMS  
 USE MAGNETIC STORMS

MAGNETIC SURVEYS  
 1401 2307  
 UF MAGNETOTELLURIC PROFILING  
 RT AEROMAGNETISM  
 GEOMAGNETISM

MAGNETIC SUSCEPTIBILITY  
 USE MAGNETIC PERMEABILITY

MAGNETIC SUSPENSION  
 2307 2311  
 GS MAGNETIC PROPERTIES  
 #MAGNETIC SUSPENSION  
 SUSPENDING (HANGING)  
 #MAGNETIC SUSPENSION  
 RT ANNUAL SUSPENSION AND POINTING  
 SYSTEM  
 LEVITATION MELTING  
 MAGNETIC BEARINGS

MAGNETIC SWITCHING  
 0902 0904 2301  
 GS SWITCHING  
 #MAGNETIC SWITCHING  
 RT ANTIFERROMAGNETISM  
 BEAM SWITCHING  
 BUBBLE MEMORY DEVICES  
 SATURABLE REACTORS

MAGNETIC TAPE RECORDERS  
 USE MAGNETIC RECORDING  
 TAPE RECORDERS

MAGNETIC TAPE TRANSPORTS  
 0801 0903 0905 1504  
 GS MECHANICAL DRIVES  
 #MAGNETIC TAPE TRANSPORTS  
 RT TAPE RECORDERS

MAGNETIC TAPES  
 0802 9001  
 GS COMPUTER STORAGE DEVICES  
 #MAGNETIC TAPES  
 ..COMPUTER COMPATIBLE TAPES  
 RT AUDIO TAPES  
 PERIPHERAL EQUIPMENT (COMPUTERS)  
 PLASTIC TAPES

PLAYBACKS  
 PUNCHED TAPES  
 READERS  
 RECORDING HEADS  
 REELS  
 TAPE RECORDERS  
 % TAPES  
 VIDEO TAPES  
  
 MAGNETIC TRANSDUCERS  
 1413 2307 3501  
 GS  
 TRANSDUCERS  
 #MAGNETIC TRANSDUCERS  
 RT ELECTROMAGNETIC MEASUREMENT  
 ELECTRONIC TRANSDUCERS  
 MICROPHONES  
  
 MAGNETIC VARIATIONS  
 1307 2307 2402  
 GS  
 VARIATIONS  
 #MAGNETIC VARIATIONS  
 ...GEOMAGNETIC PULSATIONS  
 ...GEOMAGNETIC MICROPULSATIONS  
 ...NOCTURNAL VARIATIONS  
 AEROMAGNETISM  
 ANNUAL VARIATIONS  
 DIURNAL VARIATIONS  
 IONOSPHERIC DISTURBANCES  
 KP INDEX  
 SCYLLA  
 TRAVELING IONOSPHERIC DISTURBANCES  
  
 MAGNETICALLY TRAPPED PARTICLES  
 2307 2403 2502  
 GS  
 PARTICLES  
 .CHARGED PARTICLES  
 .#MAGNETICALLY TRAPPED PARTICLES  
 ...RADIATION BELTS  
 ....ARTIFICIAL RADIATION BELTS  
 ....INNER RADIATION BELT  
 ....OUTER RADIATION BELT  
 ....PROTON BELTS  
 .TRAPPED PARTICLES  
 .#MAGNETICALLY TRAPPED PARTICLES  
 ....RADIATION BELTS  
 ....ARTIFICIAL RADIATION BELTS  
 ....INNER RADIATION BELT  
 ....OUTER RADIATION BELT  
 ....PROTON BELTS  
 PLASMA CONTROL  
 TRAPPED MAGNETIC FIELDS  
  
 RT  
  
 MAGNETITE  
 1703 1804 1806 2305 2307  
 GS CHALCOGENIDES  
  
 .OXIDES  
 ..METAL OXIDES  
 ...IRON OXIDES  
 ...#MAGNETITE  
 IRON COMPOUNDS  
 .IRON OXIDES  
 .#MAGNETITE  
 MAGNETIC MATERIALS  
 .FERROMAGNETIC MATERIALS  
 .#MAGNETITE  
 MINERALS  
 #MAGNETITE  
  
 MAGNETIZATION  
 2307  
 UF  
 RT  
 COERCIVITY  
 MAGNETIC DISPERSION  
 MAGNETIC FIELDS  
 MAGNETIC PROPERTIES  
 MAGNETOMECHANICS (PHYSICS)  
 MAGNETS  
 MAGNONS  
 % POLARIZATION  
 POLARIZATION (CHARGE SEPARATION)  
 POLARIZATION (SPIN ALIGNMENT)  
  
 MAGNETO-OPTICS  
 2306 2307 2310  
 RT  
 ACOUSTO-OPTICS  
 ELECTRO-OPTICS  
 ELECTROMAGNETIC RADIATION  
 FARADAY EFFECT  
 KERR MAGNETOOPTICAL EFFECT  
 MAGNETIC FIELDS  
 OPTICAL SWITCHING  
 % OPTICS  
 POLARIZATION (WAVES)  
 POLARIZED ELECTROMAGNETIC RADIATION  
  
 MAGNETOACOUSTIC WAVES  
 2301 2307 2308  
 GS  
 ELASTIC WAVES  
 .MAGNETOELASTIC WAVES  
 .#MAGNETOACOUSTIC WAVES  
 RT MAGNETOHYDRODYNAMIC WAVES  
 PLASMA WAVES  
  
 MAGNETOACOUSTICS  
 2301 2307 2308  
 GS  
 ACOUSTICS  
 #MAGNETOACOUSTICS  
 MAGNETIC PROPERTIES  
 #MAGNETOACOUSTICS  
  
 MAGNETOACTIVITY  
 2307 2311  
 GS  
 MAGNETIC PROPERTIES  
 #MAGNETOACTIVITY  
 ..FLUX TRANSFER EVENTS  
 ..MAGNETIC FIELD RECONNECTION  
 ..MAGNETORESISTIVITY  
 RT MAGNETIC EFFECTS  
 MAGNETIC FIELDS  
  
 MAGNETOCARDIOGRAPHY  
 0501 2307  
 GS  
 BIOENGINEERING  
 .BIOMETRICS  
 ..CARDIOGRAPHY  
 ..#MAGNETOCARDIOGRAPHY  
 RT BIOINSTRUMENTATION  
  
 MAGNETOELASTIC VIBRATIONS  
 USE MAGNETOELASTIC WAVES  
  
 MAGNETOELASTIC WAVES  
 2301 2307 3203  
 UF  
 MAGNETOELASTIC VIBRATIONS  
 ELASTIC WAVES  
 #MAGNETOELASTIC WAVES  
 ..MAGNETOACOUSTIC WAVES  
 ..ELECTROSTATIC WAVES  
 MAGNETOSONIC RESONANCE  
 MAGNETOSPHERIC INSTABILITY  
 MAGNETOSTRICTION  
 PLASMA WAVES  
 SOUND WAVES  
 ULTRASONIC RADIATION  
  
 RT  
  
 MAGNETOELASTICITY  
 USE MAGNETOSTRICTION  
  
 MAGNETOELECTRIC MEDIA  
 1704 2304 2305 2307 2402  
 RT  
 DIELECTRICS  
 MAGNETOIONICS  
 MAXWELL EQUATION  
 MECHANICAL DRIVES  
  
 MAGNETOGASDYNAMICS  
 USE MAGNETOHYDRODYNAMICS  
  
 MAGNETOGRAMS  
 USE MAGNETIC SIGNATURES  
  
 MAGNETOHYDRODYNAMIC ACCELERATION  
 USE PLASMA ACCELERATION  
  
 MAGNETOHYDRODYNAMIC FLOW



[illegible]

## WAVE-PARTICLE INTERACTIONS

## MAGNETOHYDROSTATICS

1204 2307 2502  
 GS FLUID MECHANICS  
 .HYDROMECHANICS  
 ..HYDROSTATICS  
 ..#MAGNETOHYDROSTATICS

STATICS  
 .HYDROSTATICS  
 .#MAGNETOHYDROSTATICS  
 MAGNETOHYDRODYNAMIC STABILITY

RT MAGNETOHYDRODYNAMICS  
 MAGNETOIONICS  
 PLASMA PHYSICS  
 STATIC STABILITY

MAGNETOIONIC PLASMA  
 USE PLASMAS (PHYSICS)

## MAGNETOIONICS

2304 2307 2502  
 RT ELECTROMAGNETIC WAVE TRANSMISSION  
 ELLIPTICAL POLARIZATION  
 GEOMAGNETISM

GYROFREQUENCY  
 IONOSPHERIC PROPAGATION  
 MAGNETOELECTRIC MEDIA  
 MAGNETOHYDRODYNAMICS  
 MAGNETOHYDROSTATICS  
 PLASMAS (PHYSICS)  
 RADIO TRANSMISSION

## MAGNETOMECHANICS (PHYSICS)

2307  
 RT MAGNETIC PROPERTIES  
 MAGNETIZATION  
 % PHYSICS

## MAGNETOMETERS

1406 2307 3501  
 UF GAUSSMETERS  
 GS MEASURING INSTRUMENTS  
 #MAGNETOMETERS  
 ..VARIOMETERS

RT ELECTRICAL MEASUREMENT  
 FIELD INTENSITY METERS  
 GEOMAGNETISM  
 % GRADIOMETERS

MAGNETIC MEASUREMENT  
 MAGNETIC PROBES  
 MAGNETIC SHIELDING  
 MAGSAT A SATELLITE  
 MAGSAT B SATELLITE  
 MAGSAT SATELLITES

MAGSAT 1 SATELLITE  
 NUCLEAR MAGNETIC RESONANCE  
 PROTON MASERS

MAGNETOMETRY  
 USE MAGNETIC MEASUREMENT

MAGNETOPOUSE  
 1203 1302 1307 2307 3009  
 GS ENVIRONMENTS

.EARTH MAGNETOSPHERE  
 .#MAGNETOPOUSE

RT CHAPMAN-FERRARO PROBLEM  
 FLUX TRANSFER EVENTS  
 MAGNETOSHEATH  
 MAGNETOSPHERIC INSTABILITY  
 PLANETARY MAGNETOTAILS  
 POLAR CUSPS  
 SATELLITE ATMOSPHERES  
 SOLAR WIND

## MAGNETOPLASMADYNAMICS

2302  
 RT MAGNETIC FIELDS  
 PLASMA DENSITY  
 PLASMA PROPULSION  
 ROCKET ENGINES  
 SPACECRAFT PROPULSION

## MAGNETOPLASMAS

USE PLASMAS (PHYSICS)

## MAGNETORESISTIVITY

1703 2304 2307  
 GS ELECTRICAL PROPERTIES  
 .ELECTRICAL RESISTIVITY  
 .#MAGNETORESISTIVITY  
 ELECTROMAGNETIC PROPERTIES  
 #MAGNETORESISTIVITY  
 MAGNETIC PROPERTIES  
 .MAGNETOACTIVITY

.#MAGNETORESISTIVITY  
 TRANSPORT PROPERTIES  
 .ELECTRICAL RESISTIVITY  
 .#MAGNETORESISTIVITY

RT % CONDUCTIVITY  
 ELECTROMAGNETISM  
 FERMION SURFACES  
 MAGNETIC FIELDS  
 RELUCTANCE  
 % RESISTANCE

## MAGNETOSHEATH

1302 1307 1308 3009  
 GS ENVIRONMENTS

## .EARTH MAGNETOSPHERE

.#MAGNETOSHEATH  
 BOW WAVES  
 EARTH ENVIRONMENT  
 GEOMAGNETISM  
 MAGNETOPOUSE  
 PLASMA SHEATHS  
 SHOCK FRONTS  
 SOLAR PLANETARY INTERACTIONS  
 SOLAR TERRESTRIAL INTERACTIONS  
 SOLAR WIND

RT

## MAGNETOSONIC RESONANCE

2301 2307 3408  
 GS RESONANCE  
 #MAGNETOSONIC RESONANCE  
 MAGNETOELASTIC WAVES  
 MAGNETOHYDRODYNAMICS

RT

## MAGNETOSPHERE-IONOSPHERE COUPLING

1302 1307 3009  
 UF IONOSPHERE-MAGNETOSPHERE COUPLING  
 GS COUPLING  
 #MAGNETOSPHERE-IONOSPHERE COUPLING  
 AERONOMY  
 ATMOSPHERIC PHYSICS  
 COUPLED MODES  
 EARTH IONOSPHERE

RT

EARTH MAGNETOSPHERE  
 ELECTROMAGNETIC COUPLING  
 FLUX TRANSFER EVENTS  
 % IONOSPHERES

MAGNETIC FIELD RECONNECTION  
 MAGNETOSPHERIC INSTABILITY  
 PLANETARY IONOSPHERES

## % MAGNETOSPHERES

1302 1307 2003 2307 3009  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)

RT COMETARY MAGNETOSPHERES  
 EARTH MAGNETOSPHERE  
 PLANETARY MAGNETOSPHERES  
 PULSAR MAGNETOSPHERES  
 STELLAR MAGNETOSPHERES

## MAGNETOSPHERIC ELECTRON DENSITY

1302 1307 2304 2307 3009  
 GS DENSITY (NUMBER/VOLUME)  
 .PARTICLE DENSITY (CONCENTRATION)  
 ..ELECTRON DENSITY (CONCENTRATION)  
 ..#MAGNETOSPHERIC ELECTRON DENSITY  
 ATMOSPHERIC DENSITY  
 IONOSPHERIC ELECTRON DENSITY

RT

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

|          |                        |                                    |                               |
|----------|------------------------|------------------------------------|-------------------------------|
| UF       | SPIN WAVES             | MAGNETOMETERS                      | GROUND CREWS                  |
| GS       | ELEMENTARY EXCITATIONS | MAIN SEQUENCE STARS                | GROUND SUPPORT EQUIPMENT      |
| RT       | #MAGNETISM             | 3001 3009                          | INSTALLING                    |
|          | ANTIFERROMAGNETISM     | GS CELESTIAL BODIES                | LOGISTICS                     |
|          | FERRIMAGNETISM         | .STARS                             | LOGISTICS MANAGEMENT          |
|          | FERROMAGNETISM         | .#MAIN SEQUENCE STARS              | LUBRICANTS                    |
|          | MAGNETIZATION          | ...DWARF STARS                     | LUBRICATION                   |
|          | PLASMONS               | ...DWARF NOVAE                     | MAINTAINABILITY               |
|          |                        | ...FLARE STARS                     | MANUALS                       |
|          |                        | ...RED DWARF STARS                 | MECHANICAL ENGINEERING        |
|          |                        | ...SUN                             | OPERATING COSTS               |
| MAGNUS   | EFFECT                 | RT                                 | RELIABILITY                   |
| 1202     | 1203 2308 3203         | COLOR-MAGNITUDE DIAGRAM            | REPLACING                     |
| RT       | BERNOULLI THEOREM      | EARLY STARS                        | SELF REPAIRING DEVICES        |
|          | BOUNDARY LAYER FLOW    | F STARS                            | SERVICE LIFE                  |
| %        | EFFECTS                | G STARS                            | SHIPYARDS                     |
|          | FLUID DYNAMICS         | GIANT STARS                        | SHOPS                         |
|          | FLUID FLOW             | K STARS                            | SPECIFICATIONS                |
|          | MISSILE DESIGN         | LATE STARS                         |                               |
|          | ROTATING CYLINDERS     | M STARS                            |                               |
| MAGSAT A | SATELLITE              | PRE-MAIN SEQUENCE STARS            |                               |
| 1307     |                        | STELLAR EVOLUTION                  | MAINTENANCE TRAINING          |
| GS       | ARTIFICIAL SATELLITES  | STELLAR MASS                       | 3406                          |
|          | .SCIENTIFIC SATELLITES | SUBDWARF STARS                     | GS                            |
|          | ..MAGSAT SATELLITES    | SUBGIANT STARS                     | EDUCATION                     |
| RT       | ..#MAGSAT A SATELLITE  |                                    | #MAINTENANCE TRAINING         |
|          | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT B | SATELLITE              | MAINE                              | MAJORITY CARRIERS             |
| 1307     |                        | 1305                               | 1002 2302 2602                |
| GS       | ARTIFICIAL SATELLITES  | GS                                 | CHARGE CARRIERS               |
|          | .SCIENTIFIC SATELLITES | .NATIONS                           | #MAJORITY CARRIERS            |
|          | ..MAGSAT SATELLITES    | .UNITED STATES                     | RT                            |
|          | ..#MAGSAT B SATELLITE  | .#MAINE                            | ADDITIVES                     |
| RT       | GEOMAGNETISM           | RT                                 | BIPOLAR TRANSISTORS           |
|          | MAGNETOMETERS          | ST LAWRENCE VALLEY (NORTH AMERICA) | CARRIER INJECTION             |
|          |                        |                                    | ELECTRON MOBILITY             |
| MAGSAT   | SATELLITES             | MAINTAINABILITY                    | ELECTRONS                     |
| 3107     |                        | 3404 3406 3408                     | HOLES (ELECTRON DEFICIENCIES) |
| GS       | ARTIFICIAL SATELLITES  | RT                                 | SEMICONDUCTORS (MATERIALS)    |
|          | .SCIENTIFIC SATELLITES | DESIGN ANALYSIS                    |                               |
|          | ..MAGSAT SATELLITES    | MAINTENANCE                        |                               |
|          | ...MAGSAT A SATELLITE  | RELIABILITY                        |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT   | SATELLITES             |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |
|          | ...MAGSAT B SATELLITE  |                                    |                               |
|          | ...MAGSAT 1 SATELLITE  |                                    |                               |
| RT       | GEOMAGNETISM           |                                    |                               |
|          | MAGNETOMETERS          |                                    |                               |
| MAGSAT 1 | SATELLITE              |                                    |                               |
| 3107     |                        |                                    |                               |
| GS       | ARTIFICIAL SATELLITES  |                                    |                               |
|          | .SCIENTIFIC SATELLITES |                                    |                               |
|          | ..MAGSAT SATELLITES    |                                    |                               |
|          | ...MAGSAT A SATELLITE  |                                    |                               |

# NASA THESAURUS HIERARCHICAL UPDATE

MALDIVES ISLANDS  
1305  
GS LANDFORMS  
. ISLANDS  
. #MALDIVES ISLANDS  
NATIONS  
#MALDIVES ISLANDS

MALEATES  
1808  
GS ESTERS  
#MALEATES

MALES  
0402 0404  
RT CHILDREN  
FEMALES  
HUMAN BEINGS  
SEX  
SEX FACTOR

MALFUNCTIONS  
1505 3110  
RT ABORTED MISSIONS  
AIRCRAFT ACCIDENTS  
AIRCRAFT HAZARDS  
DOWNTIME  
ERRORS  
FAILURE  
SYSTEM FAILURES

MALI  
1305  
GS NATIONS  
#MALI  
RT AFRICA

MALKUS THEORY  
1902 1905 2308  
RT STATISTICAL MECHANICS  
% THEORIES

MALLEABILITY  
1701 1704  
GS MECHANICAL PROPERTIES  
#MALLEABILITY  
RT DUCTILITY  
METAL WORKING

MALONONITRILE  
1808  
GS CYANIDES  
#MALONONITRILE  
NITRILES

#MALONONITRILE

MALTA  
1305  
GS LANDFORMS  
. ISLANDS  
#MALTA  
NATIONS  
#MALTA  
RT MEDITERRANEAN SEA

MAMMALS  
0402 0404  
GS ANIMALS  
. VERTEBRATES  
#MAMMALS  
... BATS  
... BEARS  
... CATS  
... CATTLE  
... CALVES  
... DEER  
... CARIBOUS  
... DOGS  
... GOATS  
... HORSES  
... MARINE MAMMALS  
... DOLPHINS  
... MANATEES  
... PORPOISES  
... SEALS (ANIMALS)  
... WHALES  
... MOLES  
... PRIMATES  
... APES  
... CHIMPANZEES  
... BABOONS  
... HUMAN BEINGS  
... MONKEYS  
... RODENTS  
... GUINEA PIGS  
... HAMSTERS  
... MICE  
... JERBOAS  
... POCKET MICE  
... RABBITS  
... RATS  
... SQUIRRELS  
... GROUND SQUIRRELS  
... SHEEP  
... SWINE  
... WOLVES  
EARTH RESOURCES  
HOMEOTHERMS  
MAMMARY GLANDS

RT

MAMMARY GLANDS  
0402 0404  
GS ANATOMY  
. GLANDS (ANATOMY)  
#MAMMARY GLANDS  
RT MAMMALS

MAN  
USE HUMAN BEINGS

MAN ENVIRONMENT INTERACTIONS  
0506 2001  
RT CLIMATE CHANGE  
DESERTIFICATION  
ENVIRONMENT EFFECTS  
ENVIRONMENT MANAGEMENT  
HUMAN BEINGS  
% INTERACTIONS  
INTERNATIONAL GEOSPHERE-BIOSPHERE  
PROGRAM  
RESOURCES

MAN MACHINE SYSTEMS  
0502 0503 0506 4001 9001  
GS #MAN MACHINE SYSTEMS  
. HUMAN-COMPUTER INTERFACE  
RT ASTRONAUT PERFORMANCE  
% AUTOMATION  
BALANCING  
BIONICS  
BIOTECHNOLOGY  
COMPUTER SYSTEMS DESIGN  
CONSOLES  
CYBERNETICS  
DATA PROCESSING TERMINALS  
DEPERSONALIZATION  
DISPLAY DEVICES  
% ENGINEERING  
HUMAN FACTORS ENGINEERING  
MANAGEMENT  
MECHANIZATION  
OFFICE AUTOMATION  
PILOT INDUCED OSCILLATION  
ROBOTICS  
% SYSTEMS  
SYSTEMS ANALYSIS  
SYSTEMS ENGINEERING  
SYSTEMS MANAGEMENT  
TELEOPERATORS  
VIRTUAL REALITY  
WORKSTATIONS

MAN OPERATED PROPULSION SYSTEMS  
0502 2102 2807 2808 3104



# NASA THESAURUS HIERARCHICAL UPDATE

MANAGEMENT PLANNING  
3404 3406 4001  
GS  
#MANAGEMENT PLANNING  
..PRODUCTION PLANNING  
..PROJECT PLANNING  
RT  
CONSULTING  
COST ANALYSIS  
COST REDUCTION  
DECISION MAKING  
% DEVELOPMENT  
ECONOMY  
ESTIMATES  
FEASIBILITY ANALYSIS  
FINANCE  
FORECASTING  
GERT  
HUMAN RESOURCES  
INTERFACES  
LIFE CYCLE COSTS  
MEDIATION  
MISSION PLANNING  
OPERATIONS RESEARCH  
PERSONNEL MANAGEMENT  
PERT  
PROGRAM TREND LINE ANALYSIS  
PROJECT MANAGEMENT  
RESEARCH AND DEVELOPMENT  
SELECTIVE DISSEMINATION OF  
INFORMATION  
SYSTEMS ENGINEERING  
TRADEOFFS  
VALUE ENGINEERING  
MANAGEMENT SYSTEMS  
3406  
GS  
#MANAGEMENT SYSTEMS  
..FLIGHT MANAGEMENT SYSTEMS  
..MANAGEMENT INFORMATION SYSTEMS  
RT  
COMPUTER TECHNIQUES  
INFORMATION SYSTEMS  
PROJECT MANAGEMENT  
% SYSTEMS  
MANATEES  
0402  
GS  
ANIMALS  
..VERTEBRATES  
..MAMMALS  
...MARINE MAMMALS  
...#MANATEES  
MANDELSTAM REPRESENTATION  
0705 0904 2304 2306 2309 2402 2601

GS  
MODELS  
..MATHEMATICAL MODELS  
..#MANDELSTAM REPRESENTATION  
RT  
ELEMENTARY PARTICLE INTERACTIONS  
INELASTIC SCATTERING  
LORENTZ TRANSFORMATIONS  
NUCLEAR SCATTERING  
QUANTUM THEORY  
SCATTERING AMPLITUDE  
MANDELS  
1504  
RT  
CORES  
MACHINE TOOLS  
MOLDS  
SHAFTS (MACHINE ELEMENTS)  
MANEUVERABILITY  
0101 0201 2102 3110  
RT  
AIR SLEW MISSILES  
AIRCRAFT CONTROL  
AIRCRAFT MANEUVERS  
AIRCRAFT PERFORMANCE  
CONTROLLABILITY  
FLIGHT CHARACTERISTICS  
FLIGHT CONTROL  
FLIGHT ENVELOPES  
HELICOPTER PERFORMANCE  
MANEUVERS  
SPACECRAFT MANEUVERS  
MANEUVERABLE REENTRY BODIES  
3105 3110 3501  
GS  
REENTRY VEHICLES  
#MANEUVERABLE REENTRY BODIES  
..LIFTING REENTRY VEHICLES  
...FDL-5 REENTRY VEHICLE  
...HL-10 REENTRY VEHICLE  
...HLD-35 REENTRY VEHICLE  
...JANUS SPACECRAFT  
...M-2 LIFTING BODY  
...M-2F2 LIFTING BODY  
...X-20 AIRCRAFT  
...X-24 AIRCRAFT  
RT % BODIES  
MANEUVERABLE SPACECRAFT  
3104 3110 3502  
GS  
#MANEUVERABLE SPACECRAFT  
..AEROSPACE PLANES  
..HOTOL LAUNCH VEHICLE  
...X-30 VEHICLE  
..APOLLO SPACECRAFT  
..APOLLO LUNAR EXPERIMENT MODULE  
..ASTRO VEHICLE

RT  
EVASIVE SATELLITES  
..FERRY SPACECRAFT  
..JANUS SPACECRAFT  
..RENDEZVOUS SPACECRAFT  
..X-20 AIRCRAFT  
ARTIFICIAL SATELLITES  
INTERPLANETARY SPACECRAFT  
LANDING MODULES  
LUNAR LANDING MODULES  
LUNAR PROBES  
LUNAR SATELLITES  
MANNED SPACECRAFT  
MARS (MANNED REUSABLE SPACECRAFT)  
RECOVERABLE SPACECRAFT  
REENTRY VEHICLES  
SPACE PROBES  
% SPACECRAFT  
SPACECRAFT MANEUVERS  
THRUST VECTOR CONTROL  
MANEUVERS  
0201 2102 3004 3007 3102  
GS  
#MANEUVERS  
..AIRCRAFT MANEUVERS  
..EVASIVE ACTIONS  
..HOVERING  
..ORBITAL RENDEZVOUS  
..EARTH ORBITAL RENDEZVOUS  
..LUNAR ORBITAL RENDEZVOUS  
..SIDESLIP  
..SPACECRAFT DOCKING  
..SPACECRAFT MANEUVERS  
..ORBITAL MANEUVERS  
AEROBATICS  
AIRCRAFT SPIN  
FLIGHT CONTROL  
LANDING  
MANEUVERABILITY  
MINOR CIRCLE TURNING FLIGHT  
SELF MANEUVERING UNITS  
TAKEOFF  
TURNING FLIGHT  
MANGANESE  
0603 1703  
GS  
CHEMICAL ELEMENTS  
#MANGANESE  
..MANGANESE ISOTOPES  
METALS  
..TRANSITION METALS  
..#MANGANESE  
...MANGANESE ISOTOPES  
RT  
STRATEGIC MATERIALS  
MANGANESE ALLOYS

1701 1704  
GS ALLOYS  
#MANGANESE ALLOYS  
..MANGANIN (TRADEMARK)  
MANGANESE COMPOUNDS  
0603  
GS #MANGANESE COMPOUNDS  
..MANGANESE OXIDES  
..HOPCALITE (TRADEMARK)  
..MANGANESE PHOSPHIDES  
..PERMANGANATES  
RT % CHEMICAL COMPOUNDS  
% GROUP 7B COMPOUNDS  
% METAL COMPOUNDS  
MANGANESE IONS  
0603 1804  
GS IONS  
..METAL IONS  
..#MANGANESE IONS  
RT PERMANGANATES  
MANGANESE ISOTOPES  
2406  
UF MANGANESE 53  
MANGANESE 54  
MANGANESE 56  
GS CHEMICAL ELEMENTS  
..MANGANESE  
..#MANGANESE ISOTOPES  
..NUCLIDES  
..ISOTOPES  
..#MANGANESE ISOTOPES  
METALS  
..TRANSITION METALS  
..MANGANESE  
..#MANGANESE ISOTOPES  
MANGANESE OXIDES  
0603 1804  
GS CHALCOGENIDES  
..OXIDES  
..METAL OXIDES  
..#MANGANESE OXIDES  
..HOPCALITE (TRADEMARK)  
MANGANESE COMPOUNDS  
#MANGANESE OXIDES  
..HOPCALITE (TRADEMARK)  
MANGANESE PHOSPHIDES  
0603 1804  
GS MANGANESE COMPOUNDS  
#MANGANESE PHOSPHIDES  
PHOSPHORUS COMPOUNDS

..PHOSPHIDES  
..#MANGANESE PHOSPHIDES  
MANGANESE 53  
USE MANGANESE ISOTOPES  
MANGANESE 54  
USE MANGANESE ISOTOPES  
MANGANESE 56  
USE MANGANESE ISOTOPES  
MANGANIN (TRADEMARK)  
0603 1804  
GS ALLOYS  
..COPPER ALLOYS  
..#MANGANIN (TRADEMARK)  
..MANGANESE ALLOYS  
..#MANGANIN (TRADEMARK)  
RT ELECTRICAL RESISTANCE  
THERMOCOUPLES  
MANIFOLDS  
0202 1504 3203  
RT AIR INTAKES  
EXHAUST SYSTEMS  
FUEL SYSTEMS  
INTAKE SYSTEMS  
PIPES (TUBES)  
PLENUM CHAMBERS  
% TUBES  
% WATER INTAKES  
MANIFOLDS (MATHEMATICS)  
1902  
GS #MANIFOLDS (MATHEMATICS)  
..RIEMANN MANIFOLD  
RT COORDINATES  
CURVES (GEOMETRY)  
FIBERS (MATHEMATICS)  
FIXED POINTS (MATHEMATICS)  
TOPOLOGY  
MANIPULATION  
USE MANIPULATORS  
MANIPULATORS  
0503 2102 2104  
SN (LIMITED TO MECHANICAL DEVICES FOR  
REMOTE HANDLING)  
UF MANIPULATION  
GS #MANIPULATORS  
..REMOTE MANIPULATOR SYSTEM  
RT CONTROL EQUIPMENT  
% EFFECTORS

END EFFECTORS  
INVERSE KINEMATICS  
PAYLOAD DEPLOYMENT & RETRIEVAL  
SYSTEM  
REMOTE CONTROL  
REMOTE HANDLING  
ROBOT ARMS  
ROBOT DYNAMICS  
ROBOTICS  
SERVOCONTROL  
SHIELDING  
TACTILE SENSORS (ROBOTICS)  
TELEOPERATORS  
TELEROBOTICS  
TORQUE SENSORS (ROBOTICS)  
MANITOBA  
1305  
GS NATIONS  
..CANADA  
..#MANITOBA  
MANITOU (CO)  
1305  
GS CITIES  
#MANITOU (CO)  
RT COLORADO  
MANN-WHITNEY-WILCOXON U TEST  
1905  
GS STATISTICAL ANALYSIS  
..STATISTICAL TESTS  
..#MANN-WHITNEY-WILCOXON U TEST  
RT QUALITY CONTROL  
MANNED AERODYNAMIC REUSABLE SPACESHIP  
USE MARS (MANNED REUSABLE SPACECRAFT)  
MANNED LUNAR SURFACE VEHICLES  
1105 3004 3110  
GS SURFACE VEHICLES  
..LUNAR SURFACE VEHICLES  
..LUNAR ROVING VEHICLES  
..#MANNED LUNAR SURFACE VEHICLES  
RT CRAWLER TRACTORS  
LUNAR LOGISTICS  
LUNAR MOBILE LABORATORIES  
% SURFACES  
% VEHICLES  
WALKING MACHINES  
MANNED MANEUVERING UNITS  
0502  
SN (LIMITED TO ASTRONAUT PROPULSIVE  
UNITS OF THAT NAME DESIGNED FOR



# NASA THESAURUS HIERARCHICAL UPDATE

THE SPACE TRANSPORTATION SYSTEM  
 AND THE SPACE STATION)  
 GS ASTRONAUT MANEUVERING EQUIPMENT  
 #MANNED MANEUVERING UNITS  
 RT ASTRONAUT LOCOMOTION  
 EXTRAVEHICULAR ACTIVITY  
 LIFE SUPPORT SYSTEMS  
 ORBITAL SERVICING  
 SELF MANEUVERING UNITS  
 SPACE TRANSPORTATION SYSTEM  
 MANNED MARS MISSIONS  
 3001 3009  
 GS SPACE MISSIONS  
 #MANNED MARS MISSIONS  
 RT INTERPLANETARY FLIGHT  
 INTERPLANETARY SPACECRAFT  
 LONG DURATION SPACE FLIGHT  
 MANNED SPACECRAFT  
 MARS (PLANET)  
 NASA SPACE PROGRAMS  
 RETURN TO EARTH SPACE FLIGHT  
 SPACE EXPLORATION  
 TERRAFORMING  
 MANNED ORBITAL LABORATORIES  
 3104 3109 3409  
 UF MOL (ORBITAL LABORATORIES)  
 GS LABORATORIES  
 .SPACE LABORATORIES  
 .#MANNED ORBITAL LABORATORIES  
 ...SKYLAB 1  
 ...SKYLAB 2  
 ...SKYLAB 3  
 ...SKYLAB 4  
 ...SPACELAB  
 MANNED SPACECRAFT  
 #MANNED ORBITAL LABORATORIES  
 ..SKYLAB 1  
 ..SKYLAB 2  
 ..SKYLAB 3  
 ..SKYLAB 4  
 ..SPACELAB  
 RT APOLLO SPACECRAFT  
 COLUMBUS SPACE STATION  
 ORBITAL WORKSHOPS  
 RECONNAISSANCE SPACECRAFT  
 SPACE STATIONS  
 % SPACECRAFT  
 TITAN 3 LAUNCH VEHICLE  
 MANNED ORBITAL SPACE STATIONS  
 USE SPACE STATIONS

MANNED ORBITAL TELESCOPES  
 1412 3104 3109 3001  
 UF MOT (ORBITAL TELESCOPES)  
 GS TELESCOPES  
 #MANNED ORBITAL TELESCOPES  
 ..APOLLO TELESCOPE MOUNT  
 RT DAO  
 MANNED REENTRY  
 0502 3104 3105 3303 3305 3501  
 GS ATMOSPHERIC ENTRY  
 .REENTRY  
 .#MANNED REENTRY  
 SPACE FLIGHT  
 .MANNED SPACE FLIGHT  
 .#MANNED REENTRY  
 DESCENT TRAJECTORIES  
 ENVIRONMENTAL CONTROL  
 LIFTING REENTRY VEHICLES  
 REENTRY COMMUNICATION  
 SPACECRAFT REENTRY  
 MANNED SPACE FLIGHT  
 3104 3105  
 GS SPACE FLIGHT  
 #MANNED SPACE FLIGHT  
 ..APOLLO FLIGHTS  
 ...APOLLO 5 FLIGHT  
 ...APOLLO 6 FLIGHT  
 ...APOLLO 7 FLIGHT  
 ...APOLLO 8 FLIGHT  
 ...APOLLO 9 FLIGHT  
 ...APOLLO 10 FLIGHT  
 ...APOLLO 11 FLIGHT  
 ...APOLLO 12 FLIGHT  
 ...APOLLO 13 FLIGHT  
 ...APOLLO 14 FLIGHT  
 ...APOLLO 15 FLIGHT  
 ...APOLLO 16 FLIGHT  
 ...APOLLO 17 FLIGHT  
 ..GEMINI FLIGHTS  
 ...GEMINI 3 FLIGHT  
 ...GEMINI 4 FLIGHT  
 ...GEMINI 5 FLIGHT  
 ...GEMINI 6 FLIGHT  
 ...GEMINI 7 FLIGHT  
 ...GEMINI 8 FLIGHT  
 ...GEMINI 9 FLIGHT  
 ...GEMINI 10 FLIGHT  
 ...GEMINI 11 FLIGHT  
 ...GEMINI 12 FLIGHT  
 ..MANNED REENTRY  
 ..MERCURY FLIGHTS  
 ...MERCURY MA-1 FLIGHT  
 ...MERCURY MA-2 FLIGHT

...MERCURY MA-3 FLIGHT  
 ...MERCURY MA-4 FLIGHT  
 ...MERCURY MA-5 FLIGHT  
 ...MERCURY MA-6 FLIGHT  
 ...MERCURY MA-7 FLIGHT  
 ...MERCURY MA-8 FLIGHT  
 ...MERCURY MA-9 FLIGHT  
 ...MERCURY MR-1 FLIGHT  
 ...MERCURY MR-2 FLIGHT  
 ...MERCURY MR-3 FLIGHT  
 ...MERCURY MR-4 FLIGHT  
 .SPACE SHUTTLE MISSIONS  
 ...SPACE SHUTTLE MISSION 31-A  
 ...SPACE SHUTTLE MISSION 31-B  
 ...SPACE SHUTTLE MISSION 31-C  
 ...SPACE SHUTTLE MISSION 31-D  
 ...SPACE SHUTTLE MISSION 41-A  
 ...SPACE SHUTTLE MISSION 41-B  
 ...SPACE SHUTTLE MISSION 41-C  
 ...SPACE SHUTTLE MISSION 41-D  
 ...SPACE SHUTTLE MISSION 41-G  
 ...SPACE SHUTTLE MISSION 51-A  
 ...SPACE SHUTTLE MISSION 51-B  
 ...SPACE SHUTTLE MISSION 51-C  
 ...SPACE SHUTTLE MISSION 51-D  
 ...SPACE SHUTTLE MISSION 51-E  
 ...SPACE SHUTTLE MISSION 51-F  
 ...SPACE SHUTTLE MISSION 51-G  
 ...SPACE SHUTTLE MISSION 51-H  
 ...SPACE SHUTTLE MISSION 51-I  
 ...SPACE SHUTTLE MISSION 51-J  
 ...SPACE SHUTTLE MISSION 51-L  
 ...SPACE SHUTTLE MISSION 61-A  
 ...SPACE SHUTTLE MISSION 61-B  
 ...SPACE SHUTTLE MISSION 61-C  
 ...SPACE SHUTTLE MISSION 61-E  
 AEROSPACE ENVIRONMENTS  
 APOLLO EXTENSION SYSTEM  
 ATLANTIS (ORBITER)  
 COLUMBIA (ORBITER)  
 DISCOVERY (ORBITER)  
 ENTERPRISE (ORBITER)  
 EXTRAVEHICULAR ACTIVITY  
 GEMINI (GT-1) SPACECRAFT  
 GEMINI B SPACECRAFT  
 GEMINI SPACECRAFT  
 GEMINI 2 SPACECRAFT  
 HUMAN FACTORS ENGINEERING  
 INDIAN SPACE PROGRAM  
 INTERPLANETARY FLIGHT  
 INTERSTELLAR TRAVEL  
 INTRAVEHICULAR ACTIVITY  
 LONG DURATION SPACE FLIGHT  
 MAN OPERATED PROPULSION SYSTEMS  
 MERCURY PROJECT

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                                 |                                    |  |  |
|---------------------------------|------------------------------------|--|--|
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            | MANUFACTURING                      |  |  |
| SN                              | 3404                               |  |  |
| (USE OF A MORE SPECIFIC TERM IS | GS #MANUFACTURING                  |  |  |
| RECOMMENDED--CONSULT THE TERMS  | .COMPUTER AIDED MANUFACTURING      |  |  |
| LISTED BELOW)                   | .LOW GRAVITY MANUFACTURING         |  |  |
| RT MANUAL CONTROL               | .SPACE MANUFACTURING               |  |  |
| MANUALS                         | RT AIRCRAFT PRODUCTION COSTS       |  |  |
|                                 | COMMERCE                           |  |  |
|                                 | COMMODITIES                        |  |  |
|                                 | CONTAINERLESS MELTS                |  |  |
|                                 | CONTRACT NEGOTIATION               |  |  |
|                                 | ECONOMIC DEVELOPMENT               |  |  |
|                                 | FABRICATION                        |  |  |
|                                 | INDUSTRIES                         |  |  |
|                                 | KRAFT PROCESS (WOODPULP)           |  |  |
|                                 | % PROCESSING                       |  |  |
|                                 | PRODUCTION MANAGEMENT              |  |  |
|                                 | PRODUCTS                           |  |  |
|                                 | SPACE INDUSTRIALIZATION            |  |  |
|                                 | TECHNOLOGIES                       |  |  |
|                                 | TECHNOLOGY ASSESSMENT              |  |  |
|                                 | TECHNOLOGY UTILIZATION             |  |  |
| MANURES                         |                                    |  |  |
| 0505                            |                                    |  |  |
| GS                              | WASTES                             |  |  |
|                                 | #MANURES                           |  |  |
| RT                              | BIOMASS ENERGY PRODUCTION          |  |  |
|                                 | METABOLIC WASTES                   |  |  |
|                                 | WASTE DISPOSAL                     |  |  |
|                                 | WASTE UTILIZATION                  |  |  |
| MANY BODY PROBLEM               |                                    |  |  |
| 1901 1902 3001 3002 3009        |                                    |  |  |
| UF                              | MANY PARTICLE THEORY               |  |  |
|                                 | N-BODY PROBLEM                     |  |  |
| RT                              | BCS THEORY                         |  |  |
|                                 | CELESTIAL MECHANICS                |  |  |
|                                 | ELEMENTARY EXCITATIONS             |  |  |
|                                 | FIELD THEORY (PHYSICS)             |  |  |
|                                 | FOUR BODY PROBLEM                  |  |  |
|                                 | GREEN'S FUNCTIONS                  |  |  |
|                                 | HARTREE APPROXIMATION              |  |  |
|                                 | ORBITAL MECHANICS                  |  |  |
|                                 | ORBITS                             |  |  |
|                                 | PARTICLE THEORY                    |  |  |
|                                 | PERTURBATION                       |  |  |
| MANUALS                         |                                    |  |  |
| 3405                            |                                    |  |  |
| GS                              | DOCUMENTS                          |  |  |
|                                 | #MANUALS                           |  |  |
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            | MANUFACTURING                      |  |  |
| SN                              | 3404                               |  |  |
| (USE OF A MORE SPECIFIC TERM IS | GS #MANUFACTURING                  |  |  |
| RECOMMENDED--CONSULT THE TERMS  | .COMPUTER AIDED MANUFACTURING      |  |  |
| LISTED BELOW)                   | .LOW GRAVITY MANUFACTURING         |  |  |
| RT MANUAL CONTROL               | .SPACE MANUFACTURING               |  |  |
| MANUALS                         | RT AIRCRAFT PRODUCTION COSTS       |  |  |
|                                 | COMMERCE                           |  |  |
|                                 | COMMODITIES                        |  |  |
|                                 | CONTAINERLESS MELTS                |  |  |
|                                 | CONTRACT NEGOTIATION               |  |  |
|                                 | ECONOMIC DEVELOPMENT               |  |  |
|                                 | FABRICATION                        |  |  |
|                                 | INDUSTRIES                         |  |  |
|                                 | KRAFT PROCESS (WOODPULP)           |  |  |
|                                 | % PROCESSING                       |  |  |
|                                 | PRODUCTION MANAGEMENT              |  |  |
|                                 | PRODUCTS                           |  |  |
|                                 | SPACE INDUSTRIALIZATION            |  |  |
|                                 | TECHNOLOGIES                       |  |  |
|                                 | TECHNOLOGY ASSESSMENT              |  |  |
|                                 | TECHNOLOGY UTILIZATION             |  |  |
| MANURES                         |                                    |  |  |
| 0505                            |                                    |  |  |
| GS                              | WASTES                             |  |  |
|                                 | #MANURES                           |  |  |
| RT                              | BIOMASS ENERGY PRODUCTION          |  |  |
|                                 | METABOLIC WASTES                   |  |  |
|                                 | WASTE DISPOSAL                     |  |  |
|                                 | WASTE UTILIZATION                  |  |  |
| MANY BODY PROBLEM               |                                    |  |  |
| 1901 1902 3001 3002 3009        |                                    |  |  |
| UF                              | MANY PARTICLE THEORY               |  |  |
|                                 | N-BODY PROBLEM                     |  |  |
| RT                              | BCS THEORY                         |  |  |
|                                 | CELESTIAL MECHANICS                |  |  |
|                                 | ELEMENTARY EXCITATIONS             |  |  |
|                                 | FIELD THEORY (PHYSICS)             |  |  |
|                                 | FOUR BODY PROBLEM                  |  |  |
|                                 | GREEN'S FUNCTIONS                  |  |  |
|                                 | HARTREE APPROXIMATION              |  |  |
|                                 | ORBITAL MECHANICS                  |  |  |
|                                 | ORBITS                             |  |  |
|                                 | PARTICLE THEORY                    |  |  |
|                                 | PERTURBATION                       |  |  |
| MANUALS                         |                                    |  |  |
| 3405                            |                                    |  |  |
| GS                              | DOCUMENTS                          |  |  |
|                                 | #MANUALS                           |  |  |
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            | MANUFACTURING                      |  |  |
| SN                              | 3404                               |  |  |
| (USE OF A MORE SPECIFIC TERM IS | GS #MANUFACTURING                  |  |  |
| RECOMMENDED--CONSULT THE TERMS  | .COMPUTER AIDED MANUFACTURING      |  |  |
| LISTED BELOW)                   | .LOW GRAVITY MANUFACTURING         |  |  |
| RT MANUAL CONTROL               | .SPACE MANUFACTURING               |  |  |
| MANUALS                         | RT AIRCRAFT PRODUCTION COSTS       |  |  |
|                                 | COMMERCE                           |  |  |
|                                 | COMMODITIES                        |  |  |
|                                 | CONTAINERLESS MELTS                |  |  |
|                                 | CONTRACT NEGOTIATION               |  |  |
|                                 | ECONOMIC DEVELOPMENT               |  |  |
|                                 | FABRICATION                        |  |  |
|                                 | INDUSTRIES                         |  |  |
|                                 | KRAFT PROCESS (WOODPULP)           |  |  |
|                                 | % PROCESSING                       |  |  |
|                                 | PRODUCTION MANAGEMENT              |  |  |
|                                 | PRODUCTS                           |  |  |
|                                 | SPACE INDUSTRIALIZATION            |  |  |
|                                 | TECHNOLOGIES                       |  |  |
|                                 | TECHNOLOGY ASSESSMENT              |  |  |
|                                 | TECHNOLOGY UTILIZATION             |  |  |
| MANURES                         |                                    |  |  |
| 0505                            |                                    |  |  |
| GS                              | WASTES                             |  |  |
|                                 | #MANURES                           |  |  |
| RT                              | BIOMASS ENERGY PRODUCTION          |  |  |
|                                 | METABOLIC WASTES                   |  |  |
|                                 | WASTE DISPOSAL                     |  |  |
|                                 | WASTE UTILIZATION                  |  |  |
| MANY BODY PROBLEM               |                                    |  |  |
| 1901 1902 3001 3002 3009        |                                    |  |  |
| UF                              | MANY PARTICLE THEORY               |  |  |
|                                 | N-BODY PROBLEM                     |  |  |
| RT                              | BCS THEORY                         |  |  |
|                                 | CELESTIAL MECHANICS                |  |  |
|                                 | ELEMENTARY EXCITATIONS             |  |  |
|                                 | FIELD THEORY (PHYSICS)             |  |  |
|                                 | FOUR BODY PROBLEM                  |  |  |
|                                 | GREEN'S FUNCTIONS                  |  |  |
|                                 | HARTREE APPROXIMATION              |  |  |
|                                 | ORBITAL MECHANICS                  |  |  |
|                                 | ORBITS                             |  |  |
|                                 | PARTICLE THEORY                    |  |  |
|                                 | PERTURBATION                       |  |  |
| MANUALS                         |                                    |  |  |
| 3405                            |                                    |  |  |
| GS                              | DOCUMENTS                          |  |  |
|                                 | #MANUALS                           |  |  |
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            | MANUFACTURING                      |  |  |
| SN                              | 3404                               |  |  |
| (USE OF A MORE SPECIFIC TERM IS | GS #MANUFACTURING                  |  |  |
| RECOMMENDED--CONSULT THE TERMS  | .COMPUTER AIDED MANUFACTURING      |  |  |
| LISTED BELOW)                   | .LOW GRAVITY MANUFACTURING         |  |  |
| RT MANUAL CONTROL               | .SPACE MANUFACTURING               |  |  |
| MANUALS                         | RT AIRCRAFT PRODUCTION COSTS       |  |  |
|                                 | COMMERCE                           |  |  |
|                                 | COMMODITIES                        |  |  |
|                                 | CONTAINERLESS MELTS                |  |  |
|                                 | CONTRACT NEGOTIATION               |  |  |
|                                 | ECONOMIC DEVELOPMENT               |  |  |
|                                 | FABRICATION                        |  |  |
|                                 | INDUSTRIES                         |  |  |
|                                 | KRAFT PROCESS (WOODPULP)           |  |  |
|                                 | % PROCESSING                       |  |  |
|                                 | PRODUCTION MANAGEMENT              |  |  |
|                                 | PRODUCTS                           |  |  |
|                                 | SPACE INDUSTRIALIZATION            |  |  |
|                                 | TECHNOLOGIES                       |  |  |
|                                 | TECHNOLOGY ASSESSMENT              |  |  |
|                                 | TECHNOLOGY UTILIZATION             |  |  |
| MANURES                         |                                    |  |  |
| 0505                            |                                    |  |  |
| GS                              | WASTES                             |  |  |
|                                 | #MANURES                           |  |  |
| RT                              | BIOMASS ENERGY PRODUCTION          |  |  |
|                                 | METABOLIC WASTES                   |  |  |
|                                 | WASTE DISPOSAL                     |  |  |
|                                 | WASTE UTILIZATION                  |  |  |
| MANY BODY PROBLEM               |                                    |  |  |
| 1901 1902 3001 3002 3009        |                                    |  |  |
| UF                              | MANY PARTICLE THEORY               |  |  |
|                                 | N-BODY PROBLEM                     |  |  |
| RT                              | BCS THEORY                         |  |  |
|                                 | CELESTIAL MECHANICS                |  |  |
|                                 | ELEMENTARY EXCITATIONS             |  |  |
|                                 | FIELD THEORY (PHYSICS)             |  |  |
|                                 | FOUR BODY PROBLEM                  |  |  |
|                                 | GREEN'S FUNCTIONS                  |  |  |
|                                 | HARTREE APPROXIMATION              |  |  |
|                                 | ORBITAL MECHANICS                  |  |  |
|                                 | ORBITS                             |  |  |
|                                 | PARTICLE THEORY                    |  |  |
|                                 | PERTURBATION                       |  |  |
| MANUALS                         |                                    |  |  |
| 3405                            |                                    |  |  |
| GS                              | DOCUMENTS                          |  |  |
|                                 | #MANUALS                           |  |  |
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            | MANUFACTURING                      |  |  |
| SN                              | 3404                               |  |  |
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| RECOMMENDED--CONSULT THE TERMS  | .COMPUTER AIDED MANUFACTURING      |  |  |
| LISTED BELOW)                   | .LOW GRAVITY MANUFACTURING         |  |  |
| RT MANUAL CONTROL               | .SPACE MANUFACTURING               |  |  |
| MANUALS                         | RT AIRCRAFT PRODUCTION COSTS       |  |  |
|                                 | COMMERCE                           |  |  |
|                                 | COMMODITIES                        |  |  |
|                                 | CONTAINERLESS MELTS                |  |  |
|                                 | CONTRACT NEGOTIATION               |  |  |
|                                 | ECONOMIC DEVELOPMENT               |  |  |
|                                 | FABRICATION                        |  |  |
|                                 | INDUSTRIES                         |  |  |
|                                 | KRAFT PROCESS (WOODPULP)           |  |  |
|                                 | % PROCESSING                       |  |  |
|                                 | PRODUCTION MANAGEMENT              |  |  |
|                                 | PRODUCTS                           |  |  |
|                                 | SPACE INDUSTRIALIZATION            |  |  |
|                                 | TECHNOLOGIES                       |  |  |
|                                 | TECHNOLOGY ASSESSMENT              |  |  |
|                                 | TECHNOLOGY UTILIZATION             |  |  |
| MANURES                         |                                    |  |  |
| 0505                            |                                    |  |  |
| GS                              | WASTES                             |  |  |
|                                 | #MANURES                           |  |  |
| RT                              | BIOMASS ENERGY PRODUCTION          |  |  |
|                                 | METABOLIC WASTES                   |  |  |
|                                 | WASTE DISPOSAL                     |  |  |
|                                 | WASTE UTILIZATION                  |  |  |
| MANY BODY PROBLEM               |                                    |  |  |
| 1901 1902 3001 3002 3009        |                                    |  |  |
| UF                              | MANY PARTICLE THEORY               |  |  |
|                                 | N-BODY PROBLEM                     |  |  |
| RT                              | BCS THEORY                         |  |  |
|                                 | CELESTIAL MECHANICS                |  |  |
|                                 | ELEMENTARY EXCITATIONS             |  |  |
|                                 | FIELD THEORY (PHYSICS)             |  |  |
|                                 | FOUR BODY PROBLEM                  |  |  |
|                                 | GREEN'S FUNCTIONS                  |  |  |
|                                 | HARTREE APPROXIMATION              |  |  |
|                                 | ORBITAL MECHANICS                  |  |  |
|                                 | ORBITS                             |  |  |
|                                 | PARTICLE THEORY                    |  |  |
|                                 | PERTURBATION                       |  |  |
| MANUALS                         |                                    |  |  |
| 3405                            |                                    |  |  |
| GS                              | DOCUMENTS                          |  |  |
|                                 | #MANUALS                           |  |  |
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            | MANUFACTURING                      |  |  |
| SN                              | 3404                               |  |  |
| (USE OF A MORE SPECIFIC TERM IS | GS #MANUFACTURING                  |  |  |
| RECOMMENDED--CONSULT THE TERMS  | .COMPUTER AIDED MANUFACTURING      |  |  |
| LISTED BELOW)                   | .LOW GRAVITY MANUFACTURING         |  |  |
| RT MANUAL CONTROL               | .SPACE MANUFACTURING               |  |  |
| MANUALS                         | RT AIRCRAFT PRODUCTION COSTS       |  |  |
|                                 | COMMERCE                           |  |  |
|                                 | COMMODITIES                        |  |  |
|                                 | CONTAINERLESS MELTS                |  |  |
|                                 | CONTRACT NEGOTIATION               |  |  |
|                                 | ECONOMIC DEVELOPMENT               |  |  |
|                                 | FABRICATION                        |  |  |
|                                 | INDUSTRIES                         |  |  |
|                                 | KRAFT PROCESS (WOODPULP)           |  |  |
|                                 | % PROCESSING                       |  |  |
|                                 | PRODUCTION MANAGEMENT              |  |  |
|                                 | PRODUCTS                           |  |  |
|                                 | SPACE INDUSTRIALIZATION            |  |  |
|                                 | TECHNOLOGIES                       |  |  |
|                                 | TECHNOLOGY ASSESSMENT              |  |  |
|                                 | TECHNOLOGY UTILIZATION             |  |  |
| MANURES                         |                                    |  |  |
| 0505                            |                                    |  |  |
| GS                              | WASTES                             |  |  |
|                                 | #MANURES                           |  |  |
| RT                              | BIOMASS ENERGY PRODUCTION          |  |  |
|                                 | METABOLIC WASTES                   |  |  |
|                                 | WASTE DISPOSAL                     |  |  |
|                                 | WASTE UTILIZATION                  |  |  |
| MANY BODY PROBLEM               |                                    |  |  |
| 1901 1902 3001 3002 3009        |                                    |  |  |
| UF                              | MANY PARTICLE THEORY               |  |  |
|                                 | N-BODY PROBLEM                     |  |  |
| RT                              | BCS THEORY                         |  |  |
|                                 | CELESTIAL MECHANICS                |  |  |
|                                 | ELEMENTARY EXCITATIONS             |  |  |
|                                 | FIELD THEORY (PHYSICS)             |  |  |
|                                 | FOUR BODY PROBLEM                  |  |  |
|                                 | GREEN'S FUNCTIONS                  |  |  |
|                                 | HARTREE APPROXIMATION              |  |  |
|                                 | ORBITAL MECHANICS                  |  |  |
|                                 | ORBITS                             |  |  |
|                                 | PARTICLE THEORY                    |  |  |
|                                 | PERTURBATION                       |  |  |
| MANUALS                         |                                    |  |  |
| 3405                            |                                    |  |  |
| GS                              | DOCUMENTS                          |  |  |
|                                 | #MANUALS                           |  |  |
| PERSONNEL                       | ..INSTALLATION MANUALS             |  |  |
| RESEARCH MANAGEMENT             | ..USER MANUALS (COMPUTER PROGRAMS) |  |  |
| RESOURCES                       | DIRECTORIES                        |  |  |
| RETRAINING                      | HANDBOOKS                          |  |  |
|                                 | MAINTENANCE                        |  |  |
|                                 | % MANUAL                           |  |  |
|                                 | TEXTBOOKS                          |  |  |
| MANTLE (EARTH STRUCTURE)        |                                    |  |  |
| USE EARTH MANTLE                |                                    |  |  |
| % MANUAL                        |                                    |  |  |
| 3405                            |                                    |  |  |

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                        |                                              |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| RT                                               | ASTROGRAPHY<br>BONNE PROJECTION<br>CONTOURS<br>DECLINATION<br>FIXED POINTS (MATHEMATICS)<br>FUNCTIONS (MATHEMATICS)<br>GEOGRAPHIC APPLICATIONS PROGRAM<br>GEOGRAPHY<br>HEAT CAPACITY MAPPING MISSION<br>HYPISOGRAPHY<br>MAPS<br>MAPSAT<br>ORTHOPHOTOGRAPHY<br>PHOENIX QUADRANGLE (AZ)<br>PHOTOGRAMMETRY<br>PHOTOGRAPHY<br>SCALE (RATIO)<br>SPOT (FRENCH SATELLITE)<br>SURVEYS<br>TERRAIN ANALYSIS<br>TOPOGRAPHY<br>TOPOLOGY<br>TRIANGULATION | RT                                       | #MAPSAT<br>LANDSAT SATELLITES<br>MAPPING<br>REMOTE SENSING<br>STEREOPHOTOGRAPHY                                                                                                                                                                                    | RT                                                                                                                                                                                                                                                                                                                                     | EUROPEAN SPACE PROGRAM<br>SATELLITE NETWORKS |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                              | MARAGING<br>1704 3407<br>GS              | HARDENING (MATERIALS)<br>.PRECIPITATION HARDENING<br>.#MARAGING<br>HEAT TREATMENT<br>#MARAGING                                                                                                                                                                     | MARIA<br>3004 3007 3009<br>GS #MARIA<br>.LUNAR MARIA<br>RT LAVA<br>METEORITE CRATERS<br>TOPOGRAPHY                                                                                                                                                                                                                                     |                                              |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                              | MARAGING STEELS<br>1701 1704<br>GS       | ALLOYS<br>.HIGH STRENGTH ALLOYS<br>.HIGH STRENGTH STEELS<br>..#MARAGING STEELS<br>.IRON ALLOYS<br>..STEELS<br>...HIGH STRENGTH STEELS<br>...#MARAGING STEELS<br>MARTENSITIC STAINLESS STEELS<br>STAINLESS STEELS                                                   | MARIJUANA<br>0403 0409<br>GS DRUGS<br>.PSYCHOTROPIC DRUGS<br>.#MARIJUANA<br>RT ALKALOIDS                                                                                                                                                                                                                                               |                                              |
| MAPS<br>1303 1308 1902 2003 2103 3001 3009<br>GS | #MAPS<br>.ASTRONOMICAL MAPS<br>..PLANISPHERES<br>.LUNAR MAPS<br>.METEOROLOGICAL CHARTS<br>.PHOTOMAPS<br>.RADAR CLUTTER MAPS<br>.RADAR MAPS<br>.RELIEF MAPS<br>BONNE PROJECTION<br>CADASTRAL MAPPING<br>CHARTS<br>COMPUTER AIDED MAPPING<br>COORDINATES<br>DATUM (ELEVATION)<br>GEOGRAPHY<br>% GLOBES<br>HYPISOGRAPHY<br>MAPPING<br>MERCATOR PROJECTION<br>NAVIGATION AIDS<br>PHOTOMAPPING<br>SOIL MAPPING<br>SURVEYS<br>THEMATIC MAPPING     | RT                                       | MARANGONI CONVECTION<br>1308<br>GS<br>CONVECTION<br>#MARANGONI CONVECTION<br>CONVECTIVE FLOW<br>FREE CONVECTION<br>INTERFACIAL TENSION<br>LIQUID BRIDGES<br>LOW GRAVITY MANUFACTURING<br>MELTS (CRYSTAL GROWTH)<br>MICROGRAVITY<br>SPACE PROCESSING                | MARINE BIOLOGY<br>0404 1310<br>RT ALGAE<br>AQUATIC PLANTS<br>AQUICULTURE<br>% BIOLOGY<br>ENVIRONMENT EFFECTS<br>ENVIRONMENTAL QUALITY<br>FISHERIES<br>LIMNOLOGY<br>OCEANOGRAPHY<br>PHYTOPLANKTON<br>% SCIENCE<br>SEA GRASSES<br>SEALS (ANIMALS)<br>SEAWEEDES<br>SHELLFISH<br>THERMAL POLLUTION<br>WATERFOWL<br>WETLANDS<br>ZOOPLANKTON |                                              |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                              | MARBORE 2 ENGINE<br>USE J-69-T-25 ENGINE |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                        |                                              |
| %                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                              | MARECS MARITIME SATELLITES<br>0702<br>GS | ARTIFICIAL SATELLITES<br>.COMMUNICATION SATELLITES<br>.#MARECS MARITIME SATELLITES<br>.ESA SATELLITES<br>.#MARECS MARITIME SATELLITES<br>.MARITIME SATELLITES<br>.#MARECS MARITIME SATELLITES<br>ESA SPACECRAFT<br>.ESA SATELLITES<br>.#MARECS MARITIME SATELLITES | MARINE CHEMISTRY<br>1310<br>GS ENVIRONMENTAL CHEMISTRY<br>#MARINE CHEMISTRY<br>RT BIOCHEMISTRY<br>% CHEMISTRY<br>GEOCHEMISTRY<br>HYDROLOGY<br>LIMNOLOGY                                                                                                                                                                                |                                              |
| MAPSAT<br>1901<br>GS                             | ARTIFICIAL SATELLITES                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                        |                                              |

# NASA THESAURUS HIERARCHICAL UPDATE

|                         |        |                             |                                 |
|-------------------------|--------|-----------------------------|---------------------------------|
| OCEAN BOTTOM            | RT     | CHEMICAL PROPULSION         | RAIL TRANSPORTATION             |
| % SCIENCE               |        | ELECTRIC PROPULSION         | SHIPS                           |
| SEDIMENTS               |        | JET PROPULSION              | TANKER SHIPS                    |
|                         |        | NUCLEAR ELECTRIC PROPULSION | WATER VEHICLES                  |
| MARINE ENVIRONMENTS     |        | NUCLEAR PROPULSION          |                                 |
| O404 1310               |        | PROPELLER DRIVE             | MARINER C SPACECRAFT            |
| GS ENVIRONMENTS         |        | SAVANNAH NUCLEAR SHIP       | 3007 3108                       |
| #MARINE ENVIRONMENTS    |        |                             | GS INTERPLANETARY SPACECRAFT    |
| RT AQUICULTURE          | MARINE | RESOURCES                   | .#MARINER C SPACECRAFT          |
| BEACHES                 | 1306   | RESOURCES                   | UNMANNED SPACECRAFT             |
| COASTAL ECOLOGY         | GS     | .EARTH RESOURCES            | .SPACE PROBES                   |
| COASTS                  |        | .#MARINE RESOURCES          | ..#MARINER C SPACECRAFT         |
| ENVIRONMENT EFFECTS     | RT     | AQUICULTURE                 | ..#MARINER C SPACECRAFT         |
| ICE ENVIRONMENTS        |        | COASTAL ECOLOGY             |                                 |
| NEARSHORE WATER         |        | FISHERIES                   | MARINER JUPITER-SATURN FLYBY    |
| OCEAN MODELS            |        | OCEANOGRAPHY                | 3006 3007 3009 3108 3409        |
| OCEANOGRAPHY            |        | OCEANS                      | GS SPACE MISSIONS               |
| RED TIDE                |        | SEA WATER                   | .FLYBY MISSIONS                 |
| SEA BREEZE              |        | SHELLFISH                   | ..GRAND TOURS                   |
| WATERFOWL               |        | UNDERWATER RESOURCES        | ..#MARINER JUPITER-SATURN FLYBY |
| WETLANDS                |        | WATER POLLUTION             | INTERPLANETARY FLIGHT           |
|                         |        | WETLANDS                    | RT % MISSIONS                   |
| MARINE MAMMALS          |        |                             | SPACE FLIGHT                    |
| O402 0404               | MARINE | RUDDERS                     |                                 |
| GS ANIMALS              | 1204   | CONTROL SURFACES            | MARINER JUPITER-URANUS FLYBY    |
| .VERTEBRATES            | GS     | .RUDDERS                    | 3006 3007 3009 3108 3409        |
| ..MAMMALS               |        | .#MARINE RUDDERS            | GS SPACE MISSIONS               |
| ...MAMMALS              | RT     | AERIAL RUDDERS              | .FLYBY MISSIONS                 |
| ....DOLPHINS            |        | HYDROFOILS                  | ..GRAND TOURS                   |
| ....MANATEES            |        | TAIL ASSEMBLIES             | ..#MARINER JUPITER-URANUS FLYBY |
| ....PORPOISES           |        |                             | INTERPLANETARY FLIGHT           |
| ....SEALS (ANIMALS)     | MARINE | TECHNOLOGY                  | RT % MISSIONS                   |
| ....WHALES              | 3404   | TECHNOLOGIES                | SPACE FLIGHT                    |
|                         | GS     | #MARINE TECHNOLOGY          |                                 |
| MARINE METEOROLOGY      |        | AQUICULTURE                 | MARINER MARK 2 SPACECRAFT       |
| 1310 2003               |        | ARTIFICIAL HARBORS          | 3110 3007                       |
| GS METEOROLOGY          | RT     | DEEPWATER TERMINALS         | RT CASSINI MISSION              |
| .HYDROMETEOROLOGY       |        | OCEANOGRAPHY                | COMET RENDEZVOUS ASTEROID FLYBY |
| .#MARINE METEOROLOGY    |        | OFFSHORE DOCKING            | MISSION                         |
| FRONTS (METEOROLOGY)    |        | OFFSHORE ENERGY SOURCES     | FLYBY MISSIONS                  |
| OCEANOGRAPHY            |        | OFFSHORE PLATFORMS          | INTERPLANETARY FLIGHT           |
| % SCIENCE               |        | TANKER TERMINALS            | % SPACECRAFT                    |
| TYPHOONS                |        | WHARVES                     |                                 |
| WIND (METEOROLOGY)      |        |                             | MARINER PROGRAM                 |
|                         |        |                             | 3007 3108 3409                  |
| MARINE NAVIGATION       | MARINE | TRANSPORTATION              | GS PROGRAMS                     |
| USE SURFACE NAVIGATION  | 3404   | TRANSPORTATION              | .NASA PROGRAMS                  |
|                         | GS     | #MARINE TRANSPORTATION      | ..#MARINER PROGRAM              |
| MARINE PROPULSION       |        | AIR TRANSPORTATION          | ...MARINER VENUS-MERCURY 1973   |
| 2202                    | RT     | DEEPWATER TERMINALS         | ...MARINER-MERCURY 1973         |
| GS PROPULSION           |        | HARBORS                     | .SPACE PROGRAMS                 |
| #MARINE PROPULSION      |        | OFFSHORE DOCKING            | ..NASA SPACE PROGRAMS           |
| ..UNDERWATER PROPULSION |        |                             | ..#MARINER PROGRAM              |
| ...SUBMARINE PROPULSION |        |                             |                                 |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

RT ATLAS AGENA LAUNCH VEHICLES

MARINER 6 SPACE PROBE  
3108 3007  
GS INTERPLANETARY SPACECRAFT  
MARINER SPACE PROBES  
..#MARINER 6 SPACE PROBE  
..MARS PROBES  
..#MARINER 6 SPACE PROBE  
UNMANNED SPACECRAFT  
..SPACE PROBES  
..#MARINER 6 SPACE PROBE  
..MARS PROBES  
..#MARINER 6 SPACE PROBE  
..MARS PROBES  
..#MARINER 6 SPACE PROBE  
ATLAS AGENA LAUNCH VEHICLES  
MARS 69 PROJECT

RT

MARINER 7 SPACE PROBE  
3108 3007  
GS INTERPLANETARY SPACECRAFT  
MARINER SPACE PROBES  
..#MARINER 7 SPACE PROBE  
..MARS PROBES  
..#MARINER 7 SPACE PROBE  
UNMANNED SPACECRAFT  
..SPACE PROBES  
..#MARINER 7 SPACE PROBE  
..MARS PROBES  
..#MARINER 7 SPACE PROBE  
..MARS PROBES  
..#MARINER 7 SPACE PROBE  
MARS 69 PROJECT

RT

MARINER 8 SPACE PROBE  
3007 3108  
GS INTERPLANETARY SPACECRAFT  
MARINER SPACE PROBES  
..#MARINER 8 SPACE PROBE  
..MARS PROBES  
..#MARINER 8 SPACE PROBE  
UNMANNED SPACECRAFT  
..SPACE PROBES  
..#MARINER 8 SPACE PROBE  
..MARS PROBES  
..#MARINER 8 SPACE PROBE  
..MARS PROBES  
..#MARINER 8 SPACE PROBE  
MARS 71 PROJECT

RT

MARINER 9 SPACE PROBE  
3007 3108  
GS INTERPLANETARY SPACECRAFT  
MARINER SPACE PROBES  
..#MARINER 9 SPACE PROBE  
..MARS PROBES  
..#MARINER 9 SPACE PROBE

UNMANNED SPACECRAFT  
..SPACE PROBES  
..#MARINER 9 SPACE PROBE  
..MARS PROBES  
..#MARINER 9 SPACE PROBE

MARINER 10 SPACE PROBE  
3007 3108  
GS INTERPLANETARY SPACECRAFT  
MARINER SPACE PROBES  
..#MARINER 10 SPACE PROBE  
..VENUS PROBES  
..#MARINER 10 SPACE PROBE  
UNMANNED SPACECRAFT  
..SPACE PROBES  
..#MARINER 10 SPACE PROBE  
..VENUS PROBES  
..#MARINER 10 SPACE PROBE  
MARS VENUS-MERCURY 1973  
MARINER-MERCURY 1973

RT

MARINER 11 SPACE PROBE  
3007 3108  
GS INTERPLANETARY SPACECRAFT  
MARINER SPACE PROBES  
..#MARINER 11 SPACE PROBE  
UNMANNED SPACECRAFT  
..SPACE PROBES  
..#MARINER 11 SPACE PROBE

MARINER-MERCURY 1973  
3007 3108  
GS PROGRAMS  
..NASA PROGRAMS  
..#MARINER PROGRAM  
..#MARINER-MERCURY 1973  
..SPACE PROGRAMS  
..NASA PROGRAMS  
..#MARINER PROGRAM  
..#MARINER-MERCURY 1973  
..SPACE MISSIONS  
..FLYBY MISSIONS  
..#MARINER-MERCURY 1973  
..MARINER VENUS-MERCURY 1973  
MARINER 10 SPACE PROBE

RT

MARISAT SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
..MARISAT SATELLITES  
..#MARISAT 1 SATELLITE  
..RADIO COMMUNICATION

RT

MARISAT 1 SATELLITE  
3107  
GS ARTIFICIAL SATELLITES  
..MARISAT SATELLITES  
..#MARISAT 1 SATELLITE  
..RADIO COMMUNICATION

MARITIME COMMUNICATION SATELLITE (ESA)  
USE MAROTS (ESA)

MARITIME ORBITAL TEST SATELLITE  
USE MAROTS (ESA)

MARITIME SATELLITES  
0702 1104 1204  
GS ARTIFICIAL SATELLITES  
..ERS-1 (ESA SATELLITE)  
..MARECS MARITIME SATELLITES  
..MAROTS (ESA)

RT

MSAT  
NATIONAL OCEANIC SATELLITE SYSTEM  
TOPEX

MARK 1 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 1 REENTRY BODY  
INTERCONTINENTAL BALLISTIC MISSILES  
INTERMEDIATE RANGE BALLISTIC MISSILES

MARK 1 SPACECRAFT  
3110  
RT % SPACECRAFT

MARK 2 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 2 REENTRY BODY  
INTERCONTINENTAL BALLISTIC MISSILES  
INTERMEDIATE RANGE BALLISTIC MISSILES

MARK 3 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 3 REENTRY BODY  
INTERCONTINENTAL BALLISTIC MISSILES

INTERMEDIATE RANGE BALLISTIC  
MISSILES

MARK 4 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 4 REENTRY BODY  
RT INTERCONTINENTAL BALLISTIC MISSILES

MARK 5 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 5 REENTRY BODY  
RT INTERCONTINENTAL BALLISTIC MISSILES

MARK 6 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 6 REENTRY BODY  
RT INTERCONTINENTAL BALLISTIC MISSILES

MARK 11 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 11 REENTRY BODY  
RT INTERCONTINENTAL BALLISTIC MISSILES

MARK 12 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 12 REENTRY BODY  
RT INTERCONTINENTAL BALLISTIC MISSILES

MARK 17 REENTRY BODY  
3105 3501  
GS REENTRY VEHICLES  
#MARK 17 REENTRY BODY  
RT INTERCONTINENTAL BALLISTIC MISSILES

```
MARKARIAN GALAXIES
3001 3009
GS CELESTIAL BODIES
.GALAXIES
..ACTIVE GALAXIES
..#MARKARIAN GALAXIES
RT SEYFERT GALAXIES
```

MARKERS  
0203 0701 0705 1402  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT BEACONS  
BUOYS  
CRAYONS

DYES  
RADIO BEACONS  
RUNWAY LIGHTS  
SMOKE

MARKET RESEARCH  
3402  
GS  
RESEARCH  
#MARKET RESEARCH  
RT  
COMMERCE

COMMODITIES  
CONSUMERS  
MARKETING  
PRODUCT DEVELOPMENT

MARKETING  
3402 400 1  
RT COMMERCE  
CONSUMERS  
FINANCE  
INDUSTRIAL AREAS  
MANAGEMENT  
MARKET RESEARCH  
PRODUCT DEVELOPMENT  
SUPPLYING

| MARKING | 1103               | 1409 | 1504 | 1505 | 3406 | 3407 |
|---------|--------------------|------|------|------|------|------|
| UF      | LABELING (MARKING) |      |      |      |      |      |
|         | TAGGING            |      |      |      |      |      |
| GS      | #MARKING           |      |      |      |      |      |
|         | .ISOTOPIC LABELING |      |      |      |      |      |
| RT      | DETECTION          |      |      |      |      |      |
|         | IDENTIFYING        |      |      |      |      |      |
|         | MATERIALS HANDLING |      |      |      |      |      |
|         | PACKAGING          |      |      |      |      |      |
|         | STAINING           |      |      |      |      |      |
|         | % TRACERS          |      |      |      |      |      |

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MARKOV CHAINS
0802 1902 1905
GS STOCHASTIC PROCESSES
.MARKOV PROCESSES
.#MARKOV CHAINS
RT MONTE CARLO METHOD
RANDOM WALK
```

MARKOV PROCESSES  
O802 1902 1905  
GS STOCHASTIC PROCESSES  
#MARKOV PROCESSES  
..MARKOV CHAINS  
RT RANDOM PROCESSES

AROTS (ESA)

3107  
UF  
GS

- .#MAROTS (ESA)
- .ESA SATELLITES
- .#MAROTS (ESA)
- .MARITIME SATELLITES
- .#MAROTS (ESA)
- ESA SPACECRAFT
- .ESA SATELLITES
- .#MAROTS (ESA)
- EUROPEAN SPACE AGENCY
- MARISAT SATELLITES
- RANGEFINDING
- RESCUE OPERATIONS
- SHIP TERMINALS

EQUARDT R4D ENGINE  
 2102  
 S  
 ENGINES  
 #MARQUARDT R4D ENGINE  
 APOLLO PROJECT  
 AUXILIARY PROPULSION  
 COMMAND MODULES  
 % REACTION CONTROL  
 SATELLITE ATTITUDE CONTROL  
 SPACECRAFT CONTROL  
  
 IARS  
 007  
 N  
 (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 MARS (MANNED REUSABLE SPACECRAFT)  
 MARS (PLANET)  
 NAVIGATION AIDS  
 TRACKING STATIONS

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S (MANNED REUSABLE SPACECRAFT)
104
N (NOT RESTRICTED TO SPACECRAFT FOR
  FLIGHT TO PLANET MARS)
F MANNED AERODYNAMIC REUSABLE
  SPACESHIP
S MANNED SPACECRAFT
  #MARS (MANNED REUSABLE SPACECRAFT
    REENTRY VEHICLES
    - RECOVERABLE SPACECRAFT
    .. REUSABLE SPACECRAFT
    .. #MARS (MANNED REUSABLE
      SPACECRAFT)
T FERRY SPACECRAFT

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                 |                                        |                               |
|---------------------------------|----------------------------------------|-------------------------------|
| MANEUVERABLE SPACECRAFT         | .. PLANETARY ENVIRONMENTS              | SPACEBORNE PHOTOGRAPHY        |
| % MARS                          | ..#MARS ENVIRONMENT                    |                               |
|                                 | ....MARS ATMOSPHERE                    |                               |
| MARS (PLANET)                   | DUST STORMS                            | MARS PROBES                   |
| 3001 3002 3007 3008             | MARS (PLANET)                          | 3007 3108                     |
| GS                              | MARS VOLCANOES                         | GS                            |
| CELESTIAL BODIES                | TERRAFORMING                           | INTERPLANETARY SPACECRAFT     |
| .PLANETS                        |                                        | #MARS PROBES                  |
| ..TERRESTRIAL PLANETS           |                                        | ..ADVANCED RECONN ELECTRIC    |
| ..#MARS (PLANET)                | MARS EXCURSION MODULE                  | SPACECRAFT                    |
| AMOR ASTEROID                   | 3007 3110                              | ..MARINER 3 SPACE PROBE       |
| APOLLO ASTEROIDS                | UF MEM (EXCURSION MODULE)              | ..MARINER 4 SPACE PROBE       |
| DEIMOS                          | GS MODULES                             | ..MARINER 6 SPACE PROBE       |
| DUST STORMS                     | .SPACECRAFT MODULES                    | ..MARINER 7 SPACE PROBE       |
| MANNED MARS MISSIONS            | ..LANDING MODULES                      | ..MARINER 8 SPACE PROBE       |
| % MARS                          | ..#MARS EXCURSION MODULE               | ..MARINER 9 SPACE PROBE       |
| MARS ATMOSPHERE                 | SOFT LANDING SPACECRAFT                | ..MARS OBSERVER               |
| MARS ENVIRONMENT                | .LANDING MODULES                       | ..MARS 1 SPACECRAFT           |
| MARS SAMPLE RETURN MISSIONS     | .#MARS EXCURSION MODULE                | ..MARS 2 SPACECRAFT           |
| MARS SURFACE                    | SPACECRAFT COMPONENTS                  | ..MARS 3 SPACECRAFT           |
| MARS VOLCANOES                  | .SPACECRAFT MODULES                    | ..MARS 4 SPACECRAFT           |
| PHOBOS                          | ..LANDING MODULES                      | ..MARS 5 SPACECRAFT           |
| PLANETARY CRATERS               | ..#MARS EXCURSION MODULE               | ..MARS 6 SPACECRAFT           |
| POLAR CAPS                      |                                        | ..MARS 7 SPACECRAFT           |
| TERRAFORMING                    | MARS GEOSCIENCE CLIMATOLOGY ORBITER    | ..VIKING SPACECRAFT           |
|                                 | USE MARS OBSERVER                      | ..VIKING LANDER SPACECRAFT    |
| MARS ATMOSPHERE                 |                                        | ....VIKING LANDER 1           |
| 3007 3008                       | MARS LANDING                           | ....VIKING LANDER 2           |
| GS                              | 1105 3007                              | ....VIKING ORBITER SPACECRAFT |
| ENVIRONMENTS                    | GS LANDING                             | ....VIKING ORBITER 1          |
| ..EXTRATERRESTRIAL ENVIRONMENTS | .SPACECRAFT LANDING                    | ....VIKING ORBITER 2          |
| ..PLANETARY ENVIRONMENTS        | .#MARS LANDING                         | ....VIKING ORBITER 1975       |
| ...MARS ENVIRONMENT             | RT AEPS                                | ....VIKING 1 SPACECRAFT       |
| ...#MARS ATMOSPHERE             | MARS SAMPLE RETURN MISSIONS            | ....VIKING LANDER 1           |
| ...PLANETARY ATMOSPHERES        | PLANETARY LANDING                      | ....VIKING ORBITER 1          |
| ...#MARS ATMOSPHERE             | SOFT LANDING                           | ....VIKING 2 SPACECRAFT       |
| RT AEROSPACE ENVIRONMENTS       | VIKING 1975 ENTRY VEHICLE              | ....VIKING LANDER 2           |
| MARS (PLANET)                   |                                        | ....VIKING ORBITER 2          |
| MARS VOLCANOES                  | MARS OBSERVER                          | ..VIKING 1975 ENTRY VEHICLE   |
| PLANETARY IONOSPHERES           | 3007 3108                              | ..ZOND 2 SPACE PROBE          |
| PLANETARY METEOROLOGY           | UF MARS GEOSCIENCE CLIMATOLOGY ORBITER | UNMANNED SPACECRAFT           |
|                                 | GS MGCO                                | .SPACE PROBES                 |
| MARS CRATERS                    | INTERPLANETARY SPACECRAFT              | .#MARS PROBES                 |
| 3007 1306                       | .MARS PROBES                           | ..ADVANCED RECONN ELECTRIC    |
| GS CRATERS                      | .#MARS OBSERVER                        | SPACECRAFT                    |
| .PLANETARY CRATERS              | UNMANNED SPACECRAFT                    | ...MARINER 3 SPACE PROBE      |
| .#MARS CRATERS                  | .SPACE PROBES                          | ...MARINER 4 SPACE PROBE      |
| RT CRATERING                    | ..MARS PROBES                          | ...MARINER 6 SPACE PROBE      |
| EJECTA                          | ..#MARS OBSERVER                       | ...MARINER 7 SPACE PROBE      |
| IMPACT DAMAGE                   |                                        | ...MARINER 8 SPACE PROBE      |
| METEORITE CRATERS               | MARS PHOTOGRAPHS                       | ...MARINER 9 SPACE PROBE      |
| METEORITIC DAMAGE               | 1407                                   | ...MARS OBSERVER              |
|                                 | GS PHOTOGRAPHS                         | ...MARS 1 SPACECRAFT          |
| MARS ENVIRONMENT                | #MARS PHOTOGRAPHS                      | ...MARS 2 SPACECRAFT          |
| 3007 3008                       | PHOTOGRAPHY                            | ...MARS 3 SPACECRAFT          |
| GS ENVIRONMENTS                 | SATELLITE-BORNE PHOTOGRAPHY            | ...MARS 4 SPACECRAFT          |
| ..EXTRATERRESTRIAL ENVIRONMENTS |                                        | ...MARS 5 SPACECRAFT          |

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...MARS 6 SPACECRAFT
...MARS 7 SPACECRAFT
...VIKING SPACECRAFT
...VIKING LANDER SPACECRAFT
...VIKING LANDER 1
...VIKING LANDER 2
...VIKING ORBITER SPACECRAFT
...VIKING ORBITER 1
...VIKING ORBITER 2
...VIKING ORBITER 1975
...VIKING 1 SPACECRAFT
...VIKING LANDER 1
...VIKING ORBITER 1
...VIKING 2 SPACECRAFT
...VIKING LANDER 2
...VIKING ORBITER 2
...ZOND 2 SPACE PROBE
RT MARINER PROGRAM
MARS SAMPLE RETURN MISSIONS
OUTER PLANETS EXPLORERS
VENUS PROBES
VOYAGER PROJECT
ZOND SPACE PROBES

MARS ROVER SAMPLE RETURN MISSION
USE MARS SAMPLE RETURN MISSIONS

MARS SAMPLE RETURN MISSIONS
3007 3108
UF MARS ROVER SAMPLE RETURN MISSION
GS SPACE MISSIONS
RT #MARS SAMPLE RETURN MISSIONS
MARS LANDING
MARS PROBES
MARS SURFACE SAMPLES
NASA SPACE PROGRAMS
ROVING VEHICLES
SAMPLES
SPACE EXPLORATION

MARS SATELLITES
3001 3002 3007 3008
GS CELESTIAL BODIES
.NATURAL SATELLITES
.#MARS SATELLITES
...DEIMOS
...PHOBOS

MARS SURFACE
3001 3008
GS PLANETARY SURFACES
#MARS SURFACE
RT CANALS
DUST STORMS

MARS (PLANET)
MARS VOLCANOES
METEORITE CRATERS
PLANETARY CRATERS
% SURFACES
TERRAFORMING
TOPOGRAPHY

MARS SURFACE SAMPLES
3406 3007
GS SAMPLES
#MARS SURFACE SAMPLES
RT ASSAYING
CHEMICAL ANALYSIS
MARS SAMPLE RETURN MISSIONS
SPECIMENS
% SURFACES
VIKING LANDER 1
VIKING LANDER 2

MARS VOLCANOES
1306 3008
GS GEOLOGY
.VOLCANOES
.#MARS VOLCANOES
LANDFORMS
.VOLCANOES
.#MARS VOLCANOES
PLANETARY GEOLOGY
#MARS VOLCANOES
RT BASALT
CALDERAS
CONES (VOLCANOES)
EFFUSIVES
LAVA
MARS (PLANET)
MARS ATMOSPHERE
MARS ENVIRONMENT
MARS SURFACE
MOUNTAINS
OROGRAPHY
PALEOMAGNETISM
PETROLOGY
ROUSE BELTS
VOLCANOLOGY

MARS 1 SPACECRAFT
3007 3108
GS INTERPLANETARY SPACECRAFT
.MARS PROBES
.#MARS 1 SPACECRAFT
SOVIET SPACECRAFT
#MARS 1 SPACECRAFT
UNMANNED SPACECRAFT
.SPACE PROBES

MARS 2 SPACECRAFT
3007 3108
GS INTERPLANETARY SPACECRAFT
.MARS PROBES
.#MARS 2 SPACECRAFT
SOVIET SPACECRAFT
#MARS 2 SPACECRAFT
UNMANNED SPACECRAFT
.SPACE PROBES
.MARS PROBES
.#MARS 2 SPACECRAFT
U.S.S.R. SPACE PROGRAM

MARS 3 SPACECRAFT
3007 3108
GS INTERPLANETARY SPACECRAFT
.MARS PROBES
.#MARS 3 SPACECRAFT
SOVIET SPACECRAFT
#MARS 3 SPACECRAFT
UNMANNED SPACECRAFT
.SPACE PROBES
.MARS PROBES
.#MARS 3 SPACECRAFT
U.S.S.R. SPACE PROGRAM

MARS 4 SPACECRAFT
3107 3009
GS INTERPLANETARY SPACECRAFT
.MARS PROBES
.#MARS 4 SPACECRAFT
SOVIET SPACECRAFT
#MARS 4 SPACECRAFT
UNMANNED SPACECRAFT
.SPACE PROBES
.MARS PROBES
.#MARS 4 SPACECRAFT
U.S.S.R. SPACE PROGRAM

MARS 5 SPACECRAFT
3007 3108
GS INTERPLANETARY SPACECRAFT
.MARS PROBES
.#MARS 5 SPACECRAFT
SOVIET SPACECRAFT
#MARS 5 SPACECRAFT
UNMANNED SPACECRAFT
.SPACE PROBES
.MARS PROBES
.#MARS 5 SPACECRAFT
U.S.S.R. SPACE PROGRAM

```

|                    |                           |
|--------------------|---------------------------|
| MARS 6 SPACECRAFT  |                           |
| 3007               |                           |
| GS                 | INTERPLANETARY SPACECRAFT |
|                    | . MARS PROBES             |
|                    | ..#MARS 6 SPACECRAFT      |
|                    | SOVIET SPACECRAFT         |
|                    | #MARS 6 SPACECRAFT        |
|                    | UNMANNED SPACECRAFT       |
|                    | . SPACE PROBES            |
|                    | .. MARS PROBES            |
|                    | ..#MARS 6 SPACECRAFT      |
| RT                 | U.S.S.R. SPACE PROGRAM    |
|                    |                           |
| MARS 7 SPACECRAFT  |                           |
| 3007               |                           |
| GS                 | INTERPLANETARY SPACECRAFT |
|                    | . MARS PROBES             |
|                    | ..#MARS 7 SPACECRAFT      |
|                    | SOVIET SPACECRAFT         |
|                    | #MARS 7 SPACECRAFT        |
|                    | UNMANNED SPACECRAFT       |
|                    | . SPACE PROBES            |
|                    | .. MARS PROBES            |
|                    | ..#MARS 7 SPACECRAFT      |
| RT                 | U.S.S.R. SPACE PROGRAM    |
|                    |                           |
| MARS 69 SPACECRAFT |                           |
| 3007               |                           |
| GS                 | PROGRAMS                  |
|                    | . NASA PROGRAMS           |
|                    | .. NASA SPACE PROGRAMS    |
|                    | ..#MARS 69 PROJECT        |
|                    | . PROJECTS                |
|                    | ..#MARS 69 PROJECT        |
|                    | . SPACE PROGRAMS          |
|                    | .. NASA SPACE PROGRAMS    |
|                    | ..#MARS 69 PROJECT        |
| RT                 | MARINER 6 SPACE PROBE     |
|                    | MARINER 7 SPACE PROBE     |
|                    | SPACE EXPLORATION         |
|                    |                           |
| MARS 71 PROJECT    |                           |
| 3007               |                           |
| GS                 | PROGRAMS                  |
|                    | . NASA PROGRAMS           |
|                    | .. NASA SPACE PROGRAMS    |
|                    | ..#MARS 71 PROJECT        |
|                    | . PROJECTS                |
|                    | ..#MARS 71 PROJECT        |
|                    | . SPACE PROGRAMS          |
|                    | .. NASA SPACE PROGRAMS    |
|                    | ..#MARS 71 PROJECT        |
| RT                 | MARINER 8 SPACE PROBE     |
|                    | SPACE EXPLORATION         |

```

MARSHES
USE MARSHLANDS

MARSHLANDS
1305 1306 1308 1310
UF BGS
COASTAL MARSHLANDS
MARSHES
SWAMPS
GS LAND
#MARSHLANDS
RT BAYOUS
EARTH RESOURCES
EARTH SURFACE
FLATS (LANDFORMS)
MUSKEGS
OCEANOGRAPHY
TIDAL FLATS
WATERFOWL
WETLANDS

MARTENSITE
1701 1704
RT AUSTENITE
HARDENING (MATERIALS)
HEAT TREATMENT
IRON ALLOYS
MARTENSITIC STAINLESS STEELS
MICROSTRUCTURE
PHASE TRANSFORMATIONS
STEELS

MARTENSITIC STAINLESS STEELS
1701 1704
GS ALLOYS
.IRON ALLOYS
..STEELS
...STAINLESS STEELS
...#MARTENSITIC STAINLESS STEELS
RT AUSTENITIC STAINLESS STEELS
MARAGING STEELS
MARTENSITE

MARTENSITIC TRANSFORMATION
1701
GS PHASE TRANSFORMATIONS
#MARTENSITIC TRANSFORMATION
RT AUSTENITE

MARTIN AIRCRAFT
O204 O207
GS #MARTIN AIRCRAFT
.B-26 AIRCRAFT
.B-57 AIRCRAFT

```

% MATERIALS SCIENCE

MASER OUTPUTS  
1601 2306 2402  
GS OUTPUT  
RT % MASER OUTPUTS  
DIFFRACTION RADIATION

LASER OUTPUTS  
MASER PUMPING  
PULSE DURATION  
RADIANT FLUX DENSITY  
WATER MASERS  
WAVELENGTHS

MASER PUMPING  
1601  
RT LASER PUMPING  
MASER OUTPUTS  
MASERS  
OPTICAL PUMPING  
% PUMPING

MASER RESONATORS  
USE MASERS

MASERS  
1601  
UF

MASER RESONATORS  
PARAMAGNETIC AMPLIFIERS  
RASERS  
STIMULATED EMISSION DEVICES  
#MASERS  
..GAS MASERS  
..HYDROGEN MASERS  
..INTERSTELLAR MASERS  
..PROTON MASERS  
..TRAVELING WAVE MASERS  
..WATER MASERS  
AMPLIFIERS

ATOMIC CLOCKS  
COHERENT ELECTROMAGNETIC RADIATION  
CROSS RELAXATION  
DIFFRACTION RADIATION  
FREQUENCY STANDARDS  
KRYPTON FLUORIDE LASERS  
LASERS  
MASER MATERIALS  
MASER PUMPING  
MICROWAVE AMPLIFIERS  
MOLECULAR OSCILLATORS  
RESONATORS  
STIMULATED EMISSION  
TRANSIENT OSCILLATIONS  
TWO-WAVELENGTH LASERS

ULTRAVIOLET LASERS

MASKING  
0702 0802  
GS #MASKING  
RT .TARGET MASKING  
AUDIOMETRY  
CHEMISORPTION  
COVERINGS  
PHOTOMASKS

MASKS  
0504 0507 0508 1504  
GS #MASKS  
RT .OXYGEN MASKS  
CHEMICAL DEFENSE  
PROTECTIVE CLOTHING

MASONITE (TRADEMARK)  
1805  
RT CELLULOSE  
% CONSTRUCTION MATERIALS  
TREES (PLANTS)  
WOOD

MASONRY  
1805 3202 3203  
GS #MASONRY  
RT .BRICKS  
CEMENTS  
CERAMICS  
CLAYS  
CONCRETES  
CONSTRUCTION  
% CONSTRUCTION MATERIALS  
MORTARS (MATERIAL)  
STRUCTURAL MEMBERS  
TILES  
VENEERS

MASS  
2311 2405 3408  
UF LOW MASS  
GS #MASS  
RT .CENTER OF MASS  
CRITICAL MASS  
GALACTIC MASS  
MISSING MASS (ASTROPHYSICS)  
PARTICLE MASS  
ELECTRON MASS  
PLANETARY MASS  
STELLAR MASS  
SUBCRITICAL MASS  
CENTER OF GRAVITY  
DE BROGLIE WAVELENGTHS

INERTIA  
MASCONS  
MASS TO LIGHT RATIOS  
MOMENTS OF INERTIA  
NEGATIVE MATTER  
RELATIVISTIC EFFECTS  
WEIGHT (MASS)

% MASS BALANCE  
0101 0102 2308  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT BALANCE  
MASS DISTRIBUTION  
MATERIAL BALANCE  
VARIABLE MASS SYSTEMS

MASS DISTRIBUTION  
2405 2901 3001 3005 3009  
GS DISTRIBUTION (PROPERTY)  
#MASS DISTRIBUTION  
RT AERODYNAMIC BALANCE  
AERODYNAMIC STABILITY  
ANGULAR DISTRIBUTION  
BALANCE  
BALLAST (MASS)  
CHARGE DISTRIBUTION  
COSMOLOGY  
COUNTERBALANCES  
DENSITY WAVE MODEL  
% DISTRIBUTION  
FLUX DENSITY  
FORCE DISTRIBUTION  
GALACTIC MASS  
INTERGALACTIC MEDIA  
INTERPLANETARY MEDIUM  
INTERSTELLAR MATTER  
LOADING MOMENTS  
LOADS (FORCES)  
% MASS BALANCE  
MASS TO LIGHT RATIOS  
METEOROID CONCENTRATION  
MISSING MASS (ASTROPHYSICS)  
MOMENT DISTRIBUTION  
MOMENTS OF INERTIA  
PRESSURE DISTRIBUTION  
SIZE DISTRIBUTION  
STAR DISTRIBUTION  
STATIC LOADS  
STRUCTURAL DESIGN CRITERIA  
VARIABLE MASS SYSTEMS

MASS DRIVERS  
2402 2803 2808

# NASA THESAURUS HIERARCHICAL UPDATE

|                              |                                  |                               |                             |
|------------------------------|----------------------------------|-------------------------------|-----------------------------|
| RT % ACCELERATORS            | PNEUMATIC PROBES                 | 3001                          | RATIOS                      |
| ELECTROMAGNETIC ACCELERATION | SPECIFIC IMPULSE                 | GS                            | .#MASS RATIOS               |
| ELECTROMAGNETIC PROPULSION   | TRANSIENT PRESSURES              |                               | .#MASS TO LIGHT RATIOS      |
| LAUNCHERS                    |                                  |                               | ASTRONOMY                   |
| MAGNETIC LEVITATION VEHICLES | MASS RATIOS                      | RT                            | ASTROPHYSICS                |
| MOON-EARTH TRAJECTORIES      | 3009 3203                        |                               | GALACTIC RADIATION          |
| PROPULSION                   | GS                               |                               | INDEXES (RATIOS)            |
| RAILGUN ACCELERATORS         | #MASS RATIOS                     |                               | LUMINOSITY                  |
| SPACECRAFT PROPULSION        | ..MASS TO LIGHT RATIOS           |                               | LUMINOUS INTENSITY          |
|                              | ..MIXING RATIOS                  |                               | MASS                        |
|                              | ..PAYLOAD MASS RATIO             |                               | MASS DISTRIBUTION           |
|                              | ..PROPELLANT MASS RATIO          |                               | MISSING MASS (ASTROPHYSICS) |
| MASS FILTERS                 | RT METALLICITY                   |                               | RADIANT FLUX DENSITY        |
| USE FLUID FILTERS            | PRESSURE RATIO                   |                               | STELLAR LUMINOSITY          |
| 1202 1203 1204               | STRUCTURAL WEIGHT                |                               | STELLAR MASS                |
| GS FLUID FLOW                | THRUST-WEIGHT RATIO              |                               |                             |
| #MASS FLOW                   |                                  |                               |                             |
| RT CROCCO-LEE THEORY         | MASS SPECTRA                     | MASS TRANSFER                 |                             |
| % FLOW THEORY                | 0601 1405 1411 2310 2402 2903    | 1203 2304 2311 3303 3304 3501 |                             |
| FLOW THEORY                  | GS SPECTRA                       | RT ABLATION                   |                             |
| GAS FLOW                     | #MASS SPECTRA                    | CHARGE TRANSFER               |                             |
| KELVIN-HELMHOLTZ INSTABILITY | RT ENERGY SPECTRA                | CONVECTIVE FLOW               |                             |
| KINETIC THEORY               | MOLECULAR SPECTRA                | CONVECTIVE HEAT TRANSFER      |                             |
| LAMINAR FLOW                 | RADIATION SPECTRA                | ENERGY TRANSFER               |                             |
| LEWIS NUMBERS                |                                  | GAS TRANSPORT                 |                             |
| LIQUID FLOW                  | MASS SPECTROMETERS               | GAS-LIQUID INTERACTIONS       |                             |
| MOLECULAR INTERACTIONS       | 0601 1405 1411 2310              | HEAT TRANSFER                 |                             |
| MULTIPHASE FLOW              | UF ION SPECTROMETERS             | LEWIS NUMBERS                 |                             |
| PIPE FLOW                    | RETARDING ION MASS SPECTROMETERS | POROUS BOUNDARY LAYER CONTROL |                             |
| SEDIMENT TRANSPORT           | MEASURING INSTRUMENTS            | SEDIMENT TRANSPORT            |                             |
| SINGLE-PHASE FLOW            | SPECTROMETERS                    | SEDFERRING                    |                             |
| SLIDING                      | .#MASS SPECTROMETERS             | TRANSPIRATION                 |                             |
| SLUMPING                     | CHEMICAL ANALYSIS                |                               |                             |
| SOLIDS FLOW                  | GAS ANALYSIS                     | MASSACHUSETTS                 |                             |
| STEADY FLOW                  | MICROANALYSIS                    | 1305                          |                             |
| STEAM FLOW                   | NEUTRON ACTIVATION ANALYSIS      | GS                            |                             |
| TURBULENT FLOW               | QUALITATIVE ANALYSIS             | NATIONS                       |                             |
| UNIFORM FLOW                 | SECONDARY ION MASS SPECTROMETRY  | .UNITED STATES                |                             |
| UNSTEADY FLOW                |                                  | .#MASSACHUSETTS               |                             |
|                              | MASS SPECTROMETRY                |                               |                             |
| MASS FLOW FACTORS            | USE MASS SPECTROSCOPY            | MASSAGING                     |                             |
| 1202 1203 1204               |                                  | 0405 0408                     |                             |
| RT DISCHARGE COEFFICIENT     | MASS SPECTROSCOPY                | GS THERAPY                    |                             |
| FLOW COEFFICIENTS            | 0601 1411 2306 2310              | #MASSAGING                    |                             |
| HEAT TRANSFER COEFFICIENTS   | UF MASS SPECTROMETRY             | RT FATIGUE (BIOLOGY)          |                             |
| HEAT TRANSMISSION            | GS SPECTROSCOPY                  | RELAXATION (PHYSIOLOGY)       |                             |
| NOZZLE GEOMETRY              | #MASS SPECTROSCOPY               |                               |                             |
|                              | RT CHEMICAL ANALYSIS             | MASSIFS                       |                             |
| MASS FLOW RATE               | GAS SPECTROSCOPY                 | 1306                          |                             |
| 1202 1203 1204 1408 3501     | MAGNETIC SPECTROSCOPY            | GS LANDFORMS                  |                             |
| GS RATES (PER TIME)          | NUCLEAR RADIATION SPECTROSCOPY   | #MASSIFS                      |                             |
| #MASS FLOW RATE              | SPECTROSCOPIC ANALYSIS           | RT EARTH CRUST                |                             |
| RT CONVECTIVE FLOW           | VACUUM SPECTROSCOPY              | % FAULTS                      |                             |
| DIFFUSION COEFFICIENT        |                                  | GEOLOGICAL FAULTS             |                             |
| FLOW VELOCITY                | MASS TO LIGHT RATIOS             | GEOLOGY                       |                             |
|                              |                                  | MOUNTAINS                     |                             |



# NASA THESAURUS HIERARCHICAL UPDATE

POROUS MATERIALS  
 PYROLYTIC MATERIALS  
 PYROPHORIC MATERIALS  
 RADIOACTIVE MATERIALS  
 RADOME MATERIALS  
 REACTOR MATERIALS  
 REFRACTORY MATERIALS  
 REINFORCING MATERIALS  
 RESERVES  
 RESOURCES  
 SELF LUBRICATING MATERIALS  
 SEMICONDUCTORS (MATERIALS)  
 SIZING MATERIALS  
 SOLIDS  
 SPACECRAFT CONSTRUCTION MATERIALS  
 SPONGES (MATERIALS)  
 STRATEGIC MATERIALS  
 SUPERHYBRID MATERIALS  
 THERMOCHROMATIC MATERIALS  
 THERMOELECTRIC MATERIALS  
 THICKENERS (MATERIALS)  
 THREE DIMENSIONAL COMPOSITES  
 VITREOUS MATERIALS  
 VYCOR

## MATERIALS HANDLING

1502 3404 1103  
 GS #MATERIALS HANDLING  
 .GROUND HANDLING  
 .PROPELLANT TRANSFER  
 .REMOTE HANDLING  
 RT AIRFIELD SURFACE MOVEMENTS

## % AUTOMATION

BLOWERS  
 CANALS  
 CARGO  
 CARGO AIRCRAFT  
 CARTS  
 CHEMICAL ENGINEERING  
 CHUTES

## % CONTAINERS

CONTINGENCY  
 CONVEYORS  
 CRANES

## DELIVERY

DISPENSERS  
 DISPOSAL

## % DISTRIBUTING

DISTRIBUTION  
 DISTRIBUTORS

## DOLLIES

## DUMPING

## EJECTION

## EJECTORS

## EMPTYING

ENCAPSULATING  
 EXCAVATION  
 FEEDERS  
 FEEDING (SUPPLYING)  
 FLUID FLOW  
 FUEL PUMPS  
 HAULING  
 HEAVY LIFT AIRSHIPS  
 HOPPERS  
 LOADING OPERATIONS  
 LUNAR LOGISTICS

## % MARKING

MATERIALS  
 MECHANICAL ENGINEERING  
 MINES (EXCAVATIONS)

## MOORING

## PACKAGING

## PIPELINES

## % PUMPING

PUMPS  
 RAILROAD HUMMING TESTS  
 RIGGING  
 SERVICES  
 SIPHONS  
 SPRAYERS  
 SPREADING

## STACKS

## % STORAGE

## TANKS (CONTAINERS)

## TRACTORS

## TRANSFERRING

## TRANSPORTATION

## TRUCKS

## UNLOADING

## VACUUM PUMPS

## WASTE DISPOSAL

## WHARVES

## MATERIALS RECOVERY

0602 3404 3407

## SN (LIMITED TO TREATMENT OF A

MATERIAL TO RECLAIM ONE OR MORE OF

## ITS COMPONENTS)

## RECLAMATION

## #MATERIALS RECOVERY

..NUCLEAR FUEL REPROCESSING

..SOLVOLYSIS

..WATER RECLAMATION

## RT % ABSORPTION

## BY-PRODUCTS

## CENTRIFUGING

## CRYSTALLIZATION

## DISPOSAL

## DISTILLATION

EXTRACTION  
 FILTRATION  
 % MATERIALS  
 % PRECIPITATION  
 PRECIPITATION (CHEMISTRY)  
 % PROCESSING  
 % RECOVERY  
 RECYCLING  
 REFINING  
 REMOVAL  
 % SEPARATION

## % MATERIALS SCIENCE

0603 1704 2311 2601 2603 3202 3203

## 3404

SN (USE OF A MORE SPECIFIC TERM IS

RECOMMENDED--CONSULT THE TERMS

LISTED BELOW)

RT CERAMICS

LASER CUTTING

MASER MATERIALS

% MATERIALS

METAL FOAMS

PLASTICS

% PROPERTIES

% SCIENCE

## MATERIALS TESTING REACTORS

USE NUCLEAR RESEARCH AND TEST REACTORS

## % MATERIALS TESTS

1505 1704 1805 3404

SN (USE OF A MORE SPECIFIC TERM IS

RECOMMENDED--CONSULT THE TERMS

LISTED BELOW)

RT BEND TESTS

BURST TESTS

CHARPY IMPACT TEST

CHEMICAL ANALYSIS

COMPRESSION TESTS

CORROSION TESTS

DESTRUCTIVE TESTS

ELECTROPHOTOMETRY

ENVIRONMENTAL TESTS

FATIGUE TESTS

FUEL TESTS

GAS ANALYSIS

HARDNESS TESTS

HIGH TEMPERATURE TESTS

IMPACT TESTS

LUBRICANT TESTS

MAGNETIC MEASUREMENT

% MATERIALS

MECHANICAL PROPERTIES

METALLOGRAPHY

```

MICROANALYSIS
NEUTRON RADIOGRAPHY
NONDESTRUCTIVE TESTS
PROPELLANT TESTS
QUALITY
QUALITY CONTROL
RADIOGRAPHY
SPECIFICATIONS
STATIC TESTS
% TESTS
ULTRASONIC TESTS
WEAR TESTS
X RAY ANALYSIS
X RAY SPECTROSCOPY

MATHEMATICAL ANALYSIS
USE APPLICATIONS OF MATHEMATICS

MATHEMATICAL LOGIC
O802 1902
GS #MATHEMATICAL LOGIC
  .ALGORITHMS
  ..GENETIC ALGORITHMS
  ..PARSING ALGORITHMS
  ..SIMPLEX METHOD
  .AXIOMS
  .FORMULAS (MATHEMATICS)
  ..BETHE-HEITLER FORMULA
  .LATTICES (MATHEMATICS)
  ..BOOLEAN ALGEBRA
  ..BOOLEAN FUNCTIONS
  .PREDICATE CALCULUS
  .SET THEORY
  ..BOREL SETS
  ..EQUIVALENCE
  ..THRESHOLD LOGIC
RT BRANCHING (MATHEMATICS)
FUNCTIONS (MATHEMATICS)
HYPOTHESES
INDUCTION (MATHEMATICS)
INSTRUCTION SETS (COMPUTERS)
% LOGIC
PHILOSOPHY
PROVING
THEOREMS
TURING MACHINES
VENN DIAGRAMS

MATHEMATICAL MODELS
O804 1902 4001
GS MODELS
  #MATHEMATICAL MODELS
  ..ANALOG SIMULATION
  ..BGK MODEL
  ..BIOLOGICAL MODELS (MATHEMATICS)

  ..DIGITAL SIMULATION
  ..MANDELSTAM REPRESENTATION
  ..PETRI NETS
  ..THOMAS-FERMI MODEL
  ..TURBULENCE MODELS
  ...K-EPSILON TURBULENCE MODEL
  ..VENEZIANO MODEL
RT AIRCRAFT MODELS
  % APPLICATIONS OF MATHEMATICS
  ASTRONOMICAL MODELS
  ASYMPTOTIC PROPERTIES
  ATMOSPHERIC MODELS
  BOND GRAPHS
  BROKEN SYMMETRY
  CHADS
  COMPUTATIONAL ASTROPHYSICS
  COMPUTATIONAL GRIDS
  COMPUTER SYSTEMS SIMULATION
  COMPUTERIZED SIMULATION
  CONTINUUM MODELING
  CONTROL SYSTEMS DESIGN
  DECISION THEORY
  DYNAMIC MODELS
  DYNAMIC PROGRAMMING
  DYNAMICAL SYSTEMS
  EXHAUST FLOW SIMULATION
  EXPERIMENT DESIGN
  FACTORIAL DESIGN
  FLOW CHARTS
  FOOTPRINTS
  FORECASTING
  FUNCTIONS (MATHEMATICS)
  GAME THEORY
  GOODNESS OF FIT
  GRAPH THEORY
  INELASTIC STRESS
  INVENTORY CONTROLS
  LIKELIHOOD RATIO
  LINEAR PREDICTION
  LOFTING
  LUMPED PARAMETER SYSTEMS
  METHOD OF MOMENTS
  % MISSILE SIMULATORS
  MODEL REFERENCE ADAPTIVE CONTROL
  MONTE CARLO METHOD
  NUMERICAL WEATHER FORECASTING
  OCEAN MODELS
  OPERATIONS RESEARCH
  OUTLIERS (STATISTICS)
  PARAMETER IDENTIFICATION
  PARAMETERIZATION
  QUANTILES
  QUEUEING THEORY
  REGRESSION COEFFICIENTS
  RISK

ROBUSTNESS (MATHEMATICS)
SCHEDULING
SIMILARITY THEOREM
SIMULATION
SPACECRAFT MODELS
SPATIAL DEPENDENCIES
STATISTICAL DISTRIBUTIONS
STOCHASTIC PROCESSES
SYSTEM IDENTIFICATION
SYSTEMS ANALYSIS
SYSTEMS ENGINEERING
SYSTEMS SIMULATION
THREE DIMENSIONAL MODELS
TRAJECTORY ANALYSIS
TWO DIMENSIONAL BODIES
TWO DIMENSIONAL MODELS
VALIDITY
WAR GAMES

MATHEMATICAL PROGRAMMING
O802
SN (LIMITED TO MATHEMATICAL
OPTIMIZATION THEORY--EXCLUDES
COMPUTER PROGRAMMING)
GS OPTIMIZATION
  #MATHEMATICAL PROGRAMMING
  ..DYNAMIC PROGRAMMING
  ..LINEAR PROGRAMMING
  ..NONLINEAR PROGRAMMING
  ..QUADRATIC PROGRAMMING
RT GAME THEORY
  OPERATIONS RESEARCH
  % PROGRAMMING
  SIMPLEX METHOD

MATHEMATICAL TABLES
1902 1905
GS TABLES (DATA)
  #MATHEMATICAL TABLES
RT INFORMATION
  NUMERICAL ANALYSIS
  RANDOM NUMBERS

% MATHEMATICS
1902
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT ALGEBRA
  ANALYSIS (MATHEMATICS)
  AXIOMS
  BOND GRAPHS
  CALCULUS
  CURRENT ALGEBRA
  DUALITY THEOREM

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# NASA THESAURUS HIERARCHICAL UPDATE

FORMULAS (MATHEMATICS)  
 FRACTALS  
 FUNCTIONS (MATHEMATICS)  
 GEOMETRY  
 INEQUALITIES  
 INFORMATION THEORY  
 INTEGRALS  
 LATIN SQUARE METHOD  
 LATTICES (MATHEMATICS)  
 MARTINGALES  
 MORPHOLOGY  
 NUMBER THEORY  
 NUMERICAL ANALYSIS  
 PRIMITIVE EQUATIONS  
 % PRINCIPLES  
 PROBABILITY THEORY  
 RINGS (MATHEMATICS)  
 % SCIENCE  
 SERIES EXPANSION  
 STARS (MATHEMATICS)  
 STATISTICAL ANALYSIS  
 SUPERPOSITION (MATHEMATICS)  
 SYMBOLS  
 THEOREMS  
  
 MATHIEU EQUATION  
 USE MATHIEU FUNCTION  
  
 MATHIEU FUNCTION  
 1902  
 UF MATHIEU EQUATION  
 GS ANALYSIS (MATHEMATICS)  
 .COMPLEX VARIABLES  
 .#MATHIEU FUNCTION  
 FUNCTIONS (MATHEMATICS)  
 #MATHIEU FUNCTION  
 RT BOUNDARY VALUE PROBLEMS  
 DIFFERENTIAL EQUATIONS  
 EIGENVECTORS  
 % EQUATIONS  
 HILL DETERMINANT  
 ORTHOGONAL FUNCTIONS  
  
 MATRA MISSILE  
 3101 3409  
 GS MISSILES  
 .AIR TO AIR MISSILES  
 .#MATRA MISSILE  
 RT SOLID PROPELLANT ROCKET ENGINES  
  
 % MATRICES  
 O801 O802 1902  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)

RT COMPOSITE MATERIALS  
 EPOXY MATRIX COMPOSITES  
 EUTECTIC COMPOSITES  
 % GRIDS  
 % IMBEDDINGS  
 LATTICES (MATHEMATICS)  
 MATRICES (CIRCUITS)  
 MATRICES (MATHEMATICS)  
 METAL MATRIX COMPOSITES  
 MONOTECHTIC ALLOYS  
 POLYMER MATRIX COMPOSITES  
  
 MATRICES (CIRCUITS)  
 O802 O902 1001  
 GS CIRCUITS  
 #MATRICES (CIRCUITS)  
 RT LOGIC CIRCUITS  
 % MATRICES  
 SWITCHING CIRCUITS  
  
 MATRICES (MATHEMATICS)  
 1902  
 UF DIFFERENTIAL ALGEBRA  
 MATRIX ANALYSIS  
 GS ALGEBRA  
 .VECTOR SPACES  
 .#MATRICES (MATHEMATICS)  
 ...ADJOINTS  
 ...CANONICAL FORMS  
 ...EIGENVALUES  
 ...EIGENVECTORS  
 ...HESSEAN MATRICES  
 ...JORDAN FORM  
 ...STIFFNESS MATRIX  
 RT ARRAYS  
 CHIRAL DYNAMICS  
 DETERMINANTS  
 ENERGY METHODS  
 FACTOR ANALYSIS  
 FINITE ELEMENT METHOD  
 GAUSSIAN ELIMINATION  
 HERMITIAN POLYNOMIAL  
 ISOPERIMETRIC PROBLEM  
 LINEAR EQUATIONS  
 LINEAR PROGRAMMING  
 LINEAR TRANSFORMATIONS  
 LUMPED PARAMETER SYSTEMS  
 % MATRICES  
 METHOD OF MOMENTS  
 ROOTS OF EQUATIONS  
 SIMPLEX METHOD  
 SIMULTANEOUS EQUATIONS  
 SUBGROUPS  
 U SPIN SPACE  
 WALSH FUNCTION

MATRIX ANALYSIS  
 USE MATRICES (MATHEMATICS)  
  
 MATRIX MANAGEMENT  
 3406  
 GS MANAGEMENT  
 #MATRIX MANAGEMENT  
 RT ALLOCATIONS  
 LOGISTICS  
 MANAGEMENT METHODS  
 % METHODOLOGY  
 OPERATIONS RESEARCH  
 PRODUCTIVITY  
 PROJECT PLANNING  
 SCHEDULING  
 TASKS  
  
 MATRIX MATERIALS  
 1801  
 RT BISMALEIMIDE  
 CERAMIC MATRIX COMPOSITES  
 COMPOSITE MATERIALS  
 DEBONDING (MATERIALS)  
 EPOXY MATRIX COMPOSITES  
 FIBER COMPOSITES  
 FUNCTIONALLY GRADIENT MATERIALS  
 LAMINATES  
 % MATERIALS  
 METAL MATRIX COMPOSITES  
 POLYMER MATRIX COMPOSITES  
 REINFORCING MATERIALS  
 RESIN MATRIX COMPOSITES  
 RESIN TRANSFER MOLDING  
  
 MATRIX METHODS  
 O802 1902 3203  
 SN (LIMITED TO METHODS FOR STRUCTURAL  
 ANALYSIS)  
 UF MATRIX STRESS CALCULATION  
 GS STRUCTURAL ANALYSIS  
 #MATRIX METHODS  
 RT EQUILIBRIUM METHODS  
 % METHODOLOGY  
 NASTRAN  
 SPLINE FUNCTIONS  
  
 MATRIX STRESS CALCULATION  
 USE MATRIX METHODS  
  
 MATRIX THEORY  
 1902  
 RT OPERATORS (MATHEMATICS)  
 % THEORIES

MATTER (PHYSICS)  
 0401 0404 0603 2311 2401 2404 2405  
 GS #MATTER (PHYSICS)  
 .DARK MATTER  
 .DEGENERATE MATTER  
 .NEGATIVE MATTER  
 RT ANTIMATTER  
 CONDENSED MATTER PHYSICS  
 EXTRATERRESTRIAL MATTER  
 % PHYSICS  
 ROTATING MATTER

MATTER-ANTIMATTER PROPULSION  
 2800 2808  
 GS PROPULSION  
 .SPACECRAFT PROPULSION  
 .#MATTER-ANTIMATTER PROPULSION  
 RT ANNIHILATION REACTIONS  
 ANTIMATTER  
 INTERPLANETARY FLIGHT  
 INTERPLANETARY SPACECRAFT  
 INTERSTELLAR TRAVEL  
 NEGATIVE MATTER PROPULSION  
 NUCLEAR PROPULSION  
 POSITRON ANNIHILATION  
 ROCKET ENGINES

MATTS (SYSTEMS)  
 0709  
 UF MULTIPLE TARGET TRAJECTORY SYSTEMS  
 GS TRACKING NETWORKS  
 #MATTS (SYSTEMS)  
 RT ABORT TRAJECTORIES  
 AIRBORNE EQUIPMENT  
 ANGULAR CORRELATION  
 TARGET ACQUISITION

MATURING  
 USE GROWTH

MAULER MISSILE  
 3101 3401  
 GS MISSILES  
 .ANTIAIRCRAFT MISSILES  
 .#MAULER MISSILE  
 .ANTIMISSILE MISSILES  
 .#MAULER MISSILE  
 .SURFACE TO AIR MISSILES  
 .#MAULER MISSILE  
 RT SINGLE STAGE ROCKET VEHICLES  
 SOLID PROPELLANT ROCKET ENGINES

MAURITANIA  
 1305  
 GS NATIONS

#MAURITANIA  
 RT AFRICA  
 MAURITIUS  
 1305  
 GS LANDFORMS  
 .ISLANDS  
 .#MAURITIUS  
 NATIONS  
 #MAURITIUS  
 RT AFRICA  
 INDIAN OCEAN

MAVERICK MISSILES  
 3101 3106 3401  
 GS MISSILES  
 .AIR TO SURFACE MISSILES  
 .#MAVERICK MISSILES

MAX HOLSTE MH-262 AIRCRAFT  
 USE MH-262 AIRCRAFT

MAXIMA  
 1902  
 GS ANALYSIS (MATHEMATICS)  
 .REAL VARIABLES  
 ..EXTREMUM VALUES  
 ..#MAXIMA  
 RT APEXES  
 CALCULUS OF VARIATIONS  
 CUSPS (MATHEMATICS)  
 MINIMA  
 OPTIMIZATION  
 % PEAKS  
 PENALTY FUNCTION  
 RANGE (EXTREMES)  
 ZENITH

MAXIMUM ENTROPY METHOD  
 1802  
 GS ENTROPY (STATISTICS)  
 #MAXIMUM ENTROPY METHOD  
 SPECTRUM ANALYSIS  
 #MAXIMUM ENTROPY METHOD  
 DISTRIBUTION FUNCTIONS  
 RT ENTROPY  
 FOURIER TRANSFORMATION  
 INFORMATION THEORY  
 % METHODOLOGY  
 POWER SPECTRA  
 SIGNAL PROCESSING  
 SIGNAL TO NOISE RATIOS  
 STATISTICAL ANALYSIS  
 TIME SERIES ANALYSIS

MAXIMUM LIKELIHOOD ESTIMATES  
 1902 3406  
 RT CONFIDENCE LIMITS  
 FORECASTING  
 GOODNESS OF FIT  
 LIKELIHOOD RATIO  
 PARAMETER IDENTIFICATION  
 PREDICTIONS  
 RELIABILITY  
 RISK  
 SYSTEM IDENTIFICATION

MAXIMUM PRINCIPLE  
 0802 1902  
 RT COMPLEX VARIABLES  
 DIFFERENTIAL EQUATIONS  
 ELLIPTIC DIFFERENTIAL EQUATIONS  
 HARMONIC FUNCTIONS  
 PONTRYAGIN PRINCIPLE  
 REAL VARIABLES

MAXIMUM USABLE FREQUENCY  
 0702 0705 0710  
 GS FREQUENCIES  
 #MAXIMUM USABLE FREQUENCY  
 RT FREQUENCY ASSIGNMENT  
 FREQUENCY REUSE  
 HIGH FREQUENCIES  
 VERY HIGH FREQUENCIES

MAXWELL BODIES  
 1202 1203 2308  
 RT CLASSICAL MECHANICS  
 CONTINUUM MECHANICS  
 HOOKE'S LAW  
 OSCILLATION DAMPERS  
 RELAXATION TIME

MAXWELL EQUATION  
 1203 1902 2402 2502  
 RT BOLTZMANN-VLASOV EQUATION  
 BORN-INFELD THEORY  
 ELECTRICITY  
 ELECTRODYNAMICS  
 ELECTROMECHANICS  
 % EQUATIONS  
 GAUSS EQUATION  
 MAGNETIC CHARGE DENSITY  
 MAGNETIC PROPERTIES  
 MAGNETOELECTRIC MEDIA  
 POYNTING THEOREM  
 % STOKES LAW

MAXWELL FLUIDS  
 1202 2502

# NASA THESAURUS HIERARCHICAL UPDATE

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | COMPRESSIBLE FLUIDS<br>FLUID MECHANICS<br>% FLUIDS<br>RHEOLOGY<br>VISCOELASTICITY<br>VISCIOUS FLOW<br>VISCIOUS FLUIDS                                                                                                                                                                                                                                                                                                                                                                    | MBM JUNCTIONS<br>O906<br>UF METAL-BARRIER-METAL JUNCTIONS<br>GS SEMICONDUCTOR JUNCTIONS<br>#MBM JUNCTIONS<br>RT BARRIER LAYERS<br>% BARRIERS<br>JUNCTION TRANSISTORS<br>SOLID STATE DEVICES                                                                                                                                                                                                                                                                                                                                                                                                                  | USE MACLAURIN SERIES<br>MCLEOD GAGES<br>1203 1408 1506 3501<br>GS MEASURING INSTRUMENTS<br>.PRESSURE GAGES<br>.VACUUM GAGES<br>.#MCLEOD GAGES<br>VACUUM APPARATUS<br>.VACUUM GAGES<br>.#MCLEOD GAGES<br>RT IONIZATION GAGES<br>KNUDSEN GAGES<br>PIRANI GAGES<br>PRESSURE MEASUREMENT                                                                                             |
|    | MAXWELL-BOLTZMANN DENSITY FUNCTION<br>1202 1902<br>UF MAXWELLIAN DISTRIBUTION (DENSITY)<br>GS FUNCTIONS (MATHEMATICS)<br>#MAXWELL-BOLTZMANN DENSITY FUNCTION<br>STATISTICAL ANALYSIS<br>#MAXWELL-BOLTZMANN DENSITY FUNCTION<br>RT DENSITY DISTRIBUTION<br>KINETIC THEORY<br>PROBABILITY THEORY<br>STATISTICAL MECHANICS                                                                                                                                                                  | MCDONNELL AIRCRAFT<br>O207<br>GS MCDONNELL DOUGLAS AIRCRAFT<br>#MCDONNELL AIRCRAFT<br>.C-9 AIRCRAFT<br>.DC 10 AIRCRAFT<br>.F-101 AIRCRAFT<br>.PHANTOM AIRCRAFT<br>.F-4 AIRCRAFT<br>.RF-4 AIRCRAFT<br>RT % AIRCRAFT                                                                                                                                                                                                                                                                                                                                                                                           | MCMURDO SOUND<br>1305<br>GS REGIONS<br>.POLAR REGIONS<br>.ANTARCTIC REGIONS<br>.#MCMURDO SOUND<br>SOUNDS (TOPOGRAPHIC FEATURES)<br>#MCMURDO SOUND<br>SOUTHERN HEMISPHERE<br>.ANTARCTIC REGIONS<br>.#MCMURDO SOUND<br>RT ROSS ICE SHELF                                                                                                                                           |
|    | MAXWELL-MOHR METHOD<br>2307 3203<br>RT DEFLECTION<br>% EQUILIBRIUM<br>% METHODOLOGY<br>STATIC DEFORMATION<br>TRUSSES                                                                                                                                                                                                                                                                                                                                                                     | MCDONNELL DOUGLAS AIRCRAFT<br>O204 O207<br>GS #MCDONNELL DOUGLAS AIRCRAFT<br>.DOUGLAS AIRCRAFT<br>.A-1 AIRCRAFT<br>.A-3 AIRCRAFT<br>.A-4 AIRCRAFT<br>.B-66 AIRCRAFT<br>.C-9 AIRCRAFT<br>.C-47 AIRCRAFT<br>.C-54 AIRCRAFT<br>.C-118 AIRCRAFT<br>.C-124 AIRCRAFT<br>.C-133 AIRCRAFT<br>.D-558 AIRCRAFT<br>.DC 3 AIRCRAFT<br>.DC 7 AIRCRAFT<br>.DC 8 AIRCRAFT<br>.DC 9 AIRCRAFT<br>.DC 10 AIRCRAFT<br>.PD-808 AIRCRAFT<br>.X-3 AIRCRAFT<br>.F-18 AIRCRAFT<br>MCDONNELL AIRCRAFT<br>.C-9 AIRCRAFT<br>.DC 10 AIRCRAFT<br>.F-101 AIRCRAFT<br>.PHANTOM AIRCRAFT<br>.F-4 AIRCRAFT<br>.RF-4 AIRCRAFT<br>RT % AIRCRAFT | MCR REACTORS<br>USE MILITARY COMPACT REACTORS<br>MDA<br>USE MULTIPLE DOCKING ADAPTERS<br>ME P-160 AIRCRAFT<br>USE P-160 AIRCRAFT<br>ME P-308 AIRCRAFT<br>USE P-308 AIRCRAFT<br>MEADOWLANDS<br>USE GRASSLANDS<br>MEAN<br>1902<br>GS AVERAGE<br>#MEAN<br>MOMENTS<br>.DISTRIBUTION MOMENTS<br>.#MEAN<br>RT MEDIAN (STATISTICS)<br>MODE (STATISTICS)<br>NORMALITY<br>QUALITY CONTROL |
|    | MAXWELLIAN DISTRIBUTION (DENSITY)<br>USE MAXWELL-BOLTZMANN DENSITY FUNCTION<br>MAYER PROBLEM<br>1203 2404 3304<br>RT % CONDENSATION<br>CRITICAL POINT<br>GIBBS FREE ENERGY<br>% MOLECULAR PHYSICS<br>% PROBLEMS<br>SUPERSATURATION<br>MAYPOLE ANTENNAS<br>O701<br>RT ANTENNA DESIGN<br>LARGE SPACE STRUCTURES<br>SPACE ERECTABLE STRUCTURES<br>MAZE LEARNING<br>O410 O502 1902<br>GS LEARNING<br>#MAZE LEARNING<br>RT PROBLEM SOLVING<br>MB-1 ROCKET VEHICLE<br>USE GENIE ROCKET VEHICLE |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MACLAURIN SERIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                  |

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RANGE (EXTREMES)
STATISTICAL ANALYSIS
VARIANCE (STATISTICS)

MEAN FREE PATH
2301 2402 2403
RT COLLISION PARAMETERS
% CROSS SECTIONS
  KNUDSEN FLOW
  PARTICLE COLLISIONS
  PARTICLE MOTION
% PATHS
  SCATTERING
  VACUUM

MEAN SQUARE VALUES
1902 3501
GS ANALYSIS (MATHEMATICS)
  .NUMERICAL ANALYSIS
  ..APPROXIMATION
  ..#MEAN SQUARE VALUES
RT ALGORITHMS
  ERROR ANALYSIS
  LEAST SQUARES METHOD

MEAN TIME BETWEEN FAILURES
USE MTBF

MEANDERS
1305 1306
RT OPEN CHANNEL FLOW
  RAPIDS
  RIVER BASINS
  RIVERS
  STREAMS
  TOPOGRAPHY
  VALLEYS

MEASURE AND INTEGRATION
1902
UF INTEGRATION (REAL VARIABLES)
  MEASURE THEORY
  RIEMANN INTEGRAL
  ANALYSIS (MATHEMATICS)
  .REAL VARIABLES
  .#MEASURE AND INTEGRATION
  ...BINARY INTEGRATION
  ...BOREL SETS
  ...FUNCTIONAL INTEGRATION
  ...INTEGRAL CALCULUS
  ...J INTEGRAL
  ...LEBESGUE THEOREM
  ...NUMERICAL INTEGRATION
  ...RUNGE-KUTTA METHOD
  ...STIELTJES INTEGRAL

...WEIGHTING FUNCTIONS
RT FOURIER ANALYSIS

MEASURE THEORY
USE MEASURE AND INTEGRATION

% MEASUREMENT
1406 1902 3501
SN (USE OF A MORE SPECIFIC TERM IS
  LISTED BELOW)
UF DETERMINATION
  MEASURING
  QUANTIZATION
RT ACCURACY
  ACOUSTIC MEASUREMENT
  AIRBORNE RANGE AND ORBIT
  DETERMINATION
  AIRCRAFT INSTRUMENTS
  ANALOG DATA
  ASTROMETRY
  AUDIOMETRY
  CHEMICAL ANALYSIS
  CONFIDENCE LIMITS
  CONSISTENCY
  COUNTING
% DATA
  DEFINITION
  DENSIMETERS
  DENSITY MEASUREMENT
  DEPTH MEASUREMENT
  DETECTION
  DILATOMETRY
  DIMENSIONAL MEASUREMENT
  DOWNRANGE ANTIMISSILE MEASUREMENT
  PROGRAM
  DOWNRANGE MEASUREMENT
  DRAG MEASUREMENT
  EARTH TERMINAL MEASUREMENT SYSTEM
  ELECTRICAL MEASUREMENT
  ELECTROMAGNETIC MEASUREMENT
  ELECTROMAGNETIC NOISE MEASUREMENT
  ELLIPSONOMETRY
  ESTIMATING
  EVALUATION
  EXAMINATION
  FLOW MEASUREMENT
  FREQUENCY MEASUREMENT
  FRICTION MEASUREMENT
  GAMMA RAY ABSORPTIOMETRY
  GEOMETRY
  GRAVIMETRY
  HEAT MEASUREMENT
  HIGH ALT TARGET AND BACKGROUND
  MEASUREMENT

% MEASURES
1406 1902
SN (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
RT CRITERIA
% MEASUREMENT
  STANDARDS
  MEASURING
  USE MEASUREMENT

HUMIDITY MEASUREMENT
IDENTIFYING
IN SITU MEASUREMENT
INTERNATIONAL SYSTEM OF UNITS
LATITUDE MEASUREMENT
LONGITUDE MEASUREMENT
MACROSCOPIC EQUATIONS
MAGNETIC MEASUREMENT
% MEASURES
  MEASURING INSTRUMENTS
  MECHANICAL MEASUREMENT
  METROLOGY
  MONITORS
  NOISE MEASUREMENT
  NONINTRUSIVE MEASUREMENT
  OPTICAL MEASUREMENT
  OPTOMETRY
  PHOTOGRAPHIC MEASUREMENT
  PNEUMOGRAPHY
  PRESSURE MEASUREMENT
  PROVING
  PUPILLOMETRY
  RADAR MEASUREMENT
  RADIATION MEASUREMENT
  RADIOACTIVE AGE DETERMINATION
  RANGEFINDING
  SIGNAL MEASUREMENT
  SIZE DETERMINATION
  SOUNDING
  SPHYGMOGRAPHY
  STANDARDS
  STRAIN MEASUREMENT
  SYNOPTIC MEASUREMENT
  TEMPERATURE MEASUREMENT
  THRUST MEASUREMENT
  TIME MEASUREMENT
  TRAJECTORY MEASUREMENT
  ULTRASONIC DENSIMETERS
  UNITS OF MEASUREMENT
  VELOCITY MEASUREMENT
  VIBRATION MEASUREMENT
  WEIGHT MEASUREMENT
  WIND MEASUREMENT

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# NASA THESAURUS HIERARCHICAL UPDATE

## MEASURING INSTRUMENTS

O501 1406 3501  
UF  
FLUXMETERS  
GAGES  
METERS

## RATE METERS

### GS #MEASURING INSTRUMENTS

#### ..ACCELEROMETERS

..STRAIN GAGE ACCELEROMETERS  
..AMMETERS

..MICROMILLIAMMETERS

..THERMOELEMENT AMMETERS

..ANALYZERS

..ENGINE ANALYZERS

..SIGNAL ANALYZERS

..ANEMOMETERS

..DRAG FORCE ANEMOMETERS

..HOT-FILM ANEMOMETERS

..HOT-WIRE ANEMOMETERS

..LASER ANEMOMETERS

..SONIC ANEMOMETERS

..BALLOON-BORNE INSTRUMENTS

..BATHYMETERS

..BURETTES

..CALORIMETERS

..BOMB CALORIMETERS

..DROP CALORIMETERS

..FLAME CALORIMETERS

..COMPARATORS

..CONDUCTIVITY METERS

..ELECTRICAL CONDUCTIVITY METERS

..COULOMETERS

..COUNTERS

..RADIATION COUNTERS

..CERENKOV COUNTERS

..ELECTRON COUNTERS

..GEIGER COUNTERS

..NEUTRON COUNTERS

..NEUTRON SPECTROMETERS

..PARTICLE TELESCOPES

..PROPORTIONAL COUNTERS

..QUANTUM COUNTERS

..SCINTILLATION COUNTERS

..SPARK CHAMBERS

..DEFORMETERS

..DENSIMETERS

..ULTRASONIC DENSIMETERS

..DENSITOMETERS

..MICRODENSITOMETERS

..DISTANCE MEASURING EQUIPMENT

..ALTIMETERS

..LASER ALTIMETERS

..RADIO ALTIMETERS

..GEODIMETERS

## ..RANGE FINDERS

..OPTICAL RANGE FINDERS

..LASER RANGE FINDERS

..STADIMETERS

..TELLUROMETERS

..DYNAMOMETERS

..ELASTOMETERS

..ELECTROMETERS

..ELECTRON PROBES

..ENGINE MONITORING INSTRUMENTS

..ERGOMETERS

..EUDIOMETERS

..EXTENSOMETERS

..FIELD INTENSITY METERS

..FLAME PROBES

..FLIGHT LOAD RECORDERS

..FLIGHT RECORDERS

..FLOWMETERS

..GAS METERS

..HOT-WIRE FLOWMETERS

..RHEOMETERS

..FORCE VECTOR RECORDERS

..FUEL GAGES

..CAPACITIVE FUEL GAGES

..GALVANOMETERS

..GERDIEN CONDENSERS

..GONIOMETERS

..PHOTOGONIOMETERS

..RADIOGONIOMETERS

..GRAVIMETERS

..GRAVITY GRADIOMETERS

..HELIOMETERS

..PYROHELIOMETERS

..HYDROMETERS

..HYPSONETERS

..IMPEDANCE PROBES

..RADIO FREQUENCY IMPEDANCE PROBES

..INDICATING INSTRUMENTS

..APPROACH INDICATORS

..ASTROLABES

..ATTITUDE INDICATORS

..GYRO HORIZONS

..CLOUD HEIGHT INDICATORS

..COMPASSES

..GYROCOMPASSES

..MAGNETIC COMPASSES

..SOLAR COMPASSES

..FLOW DIRECTION INDICATORS

..WIND VANES

..POSITION INDICATORS

..PLAN POSITION INDICATORS

..RADIO DIRECTION FINDERS

..SPACECRAFT POSITION INDICATORS

..SMOKE DETECTORS

..SPEED INDICATORS

## ..TACHOMETERS

..WEIGHT INDICATORS

..MICROBALANCES

..STRAIN GAGE BALANCES

..THERMOBALANCES

..INTERFEROMETERS

..ETALONS

..FABRY-PEROT INTERFEROMETERS

..INFRARED INTERFEROMETERS

..MACH-ZEHNDER INTERFEROMETERS

..MICHELSON INTERFEROMETERS

..MICROWAVE INTERFEROMETERS

..PHASE SWITCHING INTERFEROMETERS

..RADIO INTERFEROMETERS

..ION PROBES

..ION TRAPS (INSTRUMENTATION)

..LASER DOPPLER VELOCIMETERS

..MAGNETIC PROBES

..MAGNETOMETERS

..VARIOMETERS

..MECHANOGRAMS

..METEOROLOGICAL INSTRUMENTS

..BAROMETERS

..CLOUD HEIGHT INDICATORS

..DROPSONDES

..RADIOMETEOROLOGRAPHS

..RADIOSONDES

..ENDORADIOSONDES

..IONOSONDES

..RAWINSONDES

..RAIN GAGES

..WEATHER DATA RECORDERS

..WIND VANES

..MICROMETERS

..MICROWAVE PROBES

..MICROWAVE PLASMA PROBES

..MICROWAVE SENSORS

..MOISTURE METERS

..HYGROMETERS

..PSYCHROMETERS

..MONOCHROMATORS

..NOISE METERS

..OHMMETERS

..OMEGA NAVIGATION SYSTEM

..OPTICAL MEASURING INSTRUMENTS

..CATHETOMETERS

..DIFFRACTOMETERS

..EBERT SPECTROMETERS

..ELLIPSOMETERS

..ETALONS

..GEODIMETERS

..HAPLOSOPES

..INFRARED SPECTROMETERS

..FILTER WHEEL INFRARED

SPECTROMETERS

...LIGHT SCATTERING METERS  
 ...MICRODENSITOMETERS  
 ...NEPHELOMETERS  
 ...OCULOMETERS  
 ...OPTICAL PYROMETERS  
 ...OPTICAL RANGE FINDERS  
 ...LASER RANGE FINDERS  
 ...PHOTOGRAMMETERS  
 ...PHOTOMETERS  
 ...ELECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROMETERS  
 ....TOTAL OZONE MAPPING  
     SPECTROMETER  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...POLARIMETERS  
 ...REFLECTOMETERS  
 ...MICROWAVE REFLECTOMETERS  
 ...REFRACTOMETERS  
 ...SEXTANTS  
 ...SPECTROPHOTOMETERS  
 ....INFRARED SPECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...TRANSITS  
 ...THEODOLITES  
 ...CINETHEODOLITES  
 ...TRANSMISSOMETERS  
 ...OSCILLOGRAPHS  
 ...OXYGEN ANALYZERS  
 ...PENETROMETERS  
 ...PLASMA PROBES  
 ...ELECTROSTATIC PROBES  
 ...POLARISCOPE  
 ...SENARMONT POLARISCOPES  
 ...POTENTIOMETERS (INSTRUMENTS)  
 ...PRESSURE GAGES  
 ...BAROMETERS  
 ...MANOMETERS  
 ...OSMOMETERS  
 ...PIEZOELECTRIC GAGES  
 ...PIEZOMETERS  
 ...VACUUM GAGES  
 ...IONIZATION GAGES  
 ...ALPHATRONS  
 ...BAYARD-ALPERT IONIZATION GAGES  
 ...PENNING GAGES  
 ...PHILIPS IONIZATION GAGES  
 ...KNUDSEN GAGES  
 ...MCLEOD GAGES  
 ...PIRANI GAGES  
 ...PROFILOMETERS  
 ...PROTRACTORS  
 ...RADIATION MEASURING INSTRUMENTS  
 ...ACTINOMETERS  
 ...INFRARED SPECTROMETERS  
 ...PYRANOMETERS

...RADIOMETERS  
 ....DICKE RADIOMETERS  
 ....INFRARED DETECTORS  
 ....INFRARED RADIOMETERS  
 ....INFRARED SCANNERS  
 ....MICROWAVE RADIOMETERS  
 ....PASSIVE L-BAND RADIOMETERS  
 ....PRESSURE MODULATOR RADIOMETERS  
 ....SPECTRORADIOMETERS  
 ....SOLAR SPECTROMETERS  
 ....SPECTROHELIOGRAPHS  
 ....SPECTROPHOTOMETERS  
 ....INFRARED SPECTROPHOTOMETERS  
 ....ULTRAVIOLET SPECTROPHOTOMETERS  
 ....ULTRAVIOLET DETECTORS  
 ....ULTRAVIOLET SPECTROMETERS  
 ....TOTAL OZONE MAPPING  
     SPECTROMETER  
 ....ULTRAVIOLET SPECTROPHOTOMETERS  
 ....X RAY DETECTORS  
 ....BOLOMETERS  
 ....EBERT SPECTROMETERS  
 ....ELECTROSTATIC PROBES  
 ....FABRY-PEROT SPECTROMETERS  
 ....HODOSCOPES  
 ....INFRARED INSTRUMENTS  
 ....INFRARED DETECTORS  
 ....FLIR DETECTORS  
 ....INFRARED RADIOMETERS  
 ....INFRARED SCANNERS  
 ....INFRARED SPECTROMETERS  
 ....INFRARED SPECTROPHOTOMETERS  
 ....PHOTOMETERS  
 ....ELECTROPHOTOMETERS  
 ....ULTRAVIOLET SPECTROMETERS  
 ....TOTAL OZONE MAPPING  
     SPECTROMETER  
 ....ULTRAVIOLET SPECTROPHOTOMETERS  
 ...RADIATION COUNTERS  
 ...GERENKOV COUNTERS  
 ...ELECTRON COUNTERS  
 ...GEIGER COUNTERS  
 ...NEUTRON COUNTERS  
 ...NEUTRON SPECTROMETERS  
 ...PARTICLE TELESCOPES  
 ...PROPORTIONAL COUNTERS  
 ...QUANTUM COUNTERS  
 ...SCINTILLATION COUNTERS  
 ...SPARK CHAMBERS  
 ...RADIATION DETECTORS  
 ...DOSIMETERS  
 ....THRESHOLD DETECTORS  
     (DOSIMETERS)  
 ...GOLAY DETECTOR CELLS  
 ...SILICON RADIATION DETECTORS

...RIOMETERS  
 ...RATIOMETERS  
 ...RESONANCE PROBES  
 ...RESPIROMETERS  
 ...SATELLITE-BORNE INSTRUMENTS  
 ...ADVANCED VERY HIGH RESOLUTION  
     RADIOMETER  
 ...AMPS (SATELLITE PAYLOAD)  
 ...TOTAL OZONE MAPPING SPECTROMETER  
 ...SCATTEROMETERS  
 ...SHOCK MEASURING INSTRUMENTS  
 ...SONDES  
 ...DROPSONDES  
 ...JUDI-DART ROCKET  
 ...RADIOSONDES  
 ...ENDORADIOSONDES  
 ...IONOSONDES  
 ...RAWINSONDES  
 ...SPECTROMETERS  
 ...EBERT SPECTROMETERS  
 ...FABRY-PEROT SPECTROMETERS  
 ...GAMMA RAY SPECTROMETERS  
 ...IMAGING SPECTROMETERS  
 ...INFRARED SPECTROMETERS  
 ...FILTER WHEEL INFRARED  
     SPECTROMETERS  
 ...LASER SPECTROMETERS  
 ...MASS SPECTROMETERS  
 ...MICROWAVE SPECTROMETERS  
 ...NEUTRON SPECTROMETERS  
 ...SOLAR BACKSCATTER UV SPECTROMETER  
 ...SOLAR SPECTROMETERS  
 ...SPECTROHELIOGRAPHS  
 ...TIME OF FLIGHT SPECTROMETERS  
 ...ULTRAVIOLET SPECTROMETERS  
 ...HIGH DISPERSION SPECTROGRAPHS  
 ...TOTAL OZONE MAPPING SPECTROMETER  
 ...SPUTTERING GAGES  
 ...STRAIN GAGES  
 ...TEMPERATURE MEASURING INSTRUMENTS  
 ...BATHYTHERMOGRAPHS  
 ...OPTICAL PYROMETERS  
 ...PNEUMATIC PROBES  
 ...PYROMETERS  
 ...RADIATION PYROMETERS  
 ...THERMOCOUPLE PYROMETERS  
 ...TEMPERATURE PROBES  
 ...THERMOMETERS  
 ...RESISTANCE THERMOMETERS  
 ...TENSIONMETERS  
 ...TENSOMETERS  
 ...THERMAL CONDUCTIVITY GAGES  
 ...TILTMETERS  
 ...TIME MEASURING INSTRUMENTS  
 ...CLOCKS

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>...ATOMIC CLOCKS</li> <li>...AUTONOMOUS SPACECRAFT CLOCKS</li> <li>...CHRONOMETERS</li> <li>...TIMING DEVICES</li> <li>.TITRIMETERS</li> <li>.TORQUEMETERS</li> <li>.TURBULENCE METERS</li> <li>.VIBRATION METERS</li> <li>..SEISMOGRAPHS</li> <li>...LUNAR SEISMOGRAPHS</li> <li>.VISCOMETERS</li> <li>.VOLTMMETERS</li> <li>..MILLIVOLTMETERS</li> <li>.WATTMETERS</li> <li>AIRCRAFT INSTRUMENTS</li> <li>AUTOMATIC CONTROL</li> <li>AUTOMATIC TEST EQUIPMENT</li> <li>BIOINSTRUMENTATION</li> <li>CALIBRATING</li> <li>CIRCUMSOLAR TELESCOPES</li> <li>CONTROL MOMENT GYROSCOPES</li> <li>CONTROLLERS</li> <li>% DETECTORS</li> <li>DRAG MEASUREMENT</li> <li>DUOCHROMATORS</li> <li>ELECTRIC BRIDGES</li> <li>ELECTRICAL MEASUREMENT</li> <li>FLIGHT INSTRUMENTS</li> <li>FOREST FIRE DETECTION</li> <li>FRAUNHOFER LINE DISCRIMINATORS</li> <li>IMBLMS</li> <li>INSTRUMENT RECEIVERS</li> <li>INSTRUMENT TRANSMITTERS</li> <li>% INSTRUMENTS</li> <li>INTERNATIONAL SYSTEM OF UNITS</li> <li>LABORATORY EQUIPMENT</li> <li>LANDING INSTRUMENTS</li> <li>LARGE APERTURE SEISMIC ARRAY</li> <li>LOCAL SCIENTIFIC SURVEY MODULE</li> <li>LUNAR RANGEFINDING</li> <li>% MEASUREMENT</li> <li>METROLOGY</li> <li>MICROINSTRUMENTATION</li> <li>MONITORS</li> <li>% NAVIGATION INSTRUMENTS</li> <li>PROBES</li> <li>PROPELLANT ACTUATED INSTRUMENTS</li> <li>RADIO PROBING</li> <li>RADIO TELEMETRY</li> <li>RAPID BALLISTICS IDENTIFICATION</li> <li>RECORDING INSTRUMENTS</li> <li>REMOTE SENSORS</li> <li>ROCKET-BORNE INSTRUMENTS</li> <li>RONCHI TEST</li> <li>SATELLITE INSTRUMENTS</li> </ul> | <ul style="list-style-type: none"> <li>% SENSORS</li> <li>SODAR</li> <li>SOUND DETECTING AND RANGING</li> <li>SPACECRAFT INSTRUMENTS</li> <li>SYNCHROSCOPES</li> <li>TELEMETRY</li> <li>% TEST EQUIPMENT</li> <li>TRANSDUCERS</li> <li>ULTRASONIC SCANNERS</li> <li>VENTURI TUBES</li> <li>WHEATSTONE BRIDGES</li> <li>WIND TUNNEL CALIBRATION</li> <li>MECAMYLAMINE</li> <li>1808</li> <li>GS</li> <li>AMINES</li> <li>#MECAMYLAMINE</li> <li>TERPENES</li> <li>#MECAMYLAMINE</li> <li>MECHANICAL DEVICES</li> <li>0802 1402 1406 1501 1502 1504 3501</li> <li>RT</li> <li>CAMS</li> <li>CLAMPS</li> <li>CLIPS</li> <li>CLUTCHES</li> <li>% DEVICES</li> <li>% EQUIPMENT</li> <li>HOLDERS</li> <li>JIGS</li> <li>LEVERS</li> <li>LINKAGES</li> <li>MACHINE TOOLS</li> <li>% MECHANISM</li> <li>MECHANIZATION</li> <li>TOOLS</li> <li>MECHANICAL DRAWINGS</li> <li>USE ENGINEERING DRAWINGS</li> <li>MECHANICAL DRIVES</li> <li>1504</li> <li>UF</li> <li>ROTARY DRIVES</li> <li>GS</li> <li>#MECHANICAL DRIVES</li> <li>.MAGNETIC TAPE TRANSPORTS</li> <li>.PROPELLER DRIVE</li> <li>.HELICOPTER PROPELLER DRIVE</li> <li>.TRANSMISSIONS (MACHINE ELEMENTS)</li> <li>CLUTCHES</li> <li>COUNTER-ROTATING WHEELS</li> <li>COUPLING</li> <li>COUPLINGS</li> <li>% DRIVES</li> <li>% GEAR</li> <li>GEAR TEETH</li> </ul> | <ul style="list-style-type: none"> <li>GEARS</li> <li>MAGNETOELECTRIC MEDIA</li> <li>% POWER TRANSMISSION</li> <li>SHAFTS (MACHINE ELEMENTS)</li> <li>VEHICLE WHEELS</li> <li>WIND TUNNEL DRIVES</li> <li>WINDMILLS (WINDPOWERED MACHINES)</li> <li>MECHANICAL ENGINEERING</li> <li>2308 3203 3404</li> <li>RT</li> <li>AERONAUTICAL ENGINEERING</li> <li>AEROSPACE ENGINEERING</li> <li>% ENGINEERING</li> <li>FLUID FLOW</li> <li>FLYWHEELS</li> <li>FURNACES</li> <li>HEAT TRANSFER</li> <li>MACHINE TOOLS</li> <li>% MACHINERY</li> <li>MAINTENANCE</li> <li>MATERIALS HANDLING</li> <li>STRESS ANALYSIS</li> <li>THERMODYNAMICS</li> <li>VIBRATION TESTS</li> <li>MECHANICAL FINGERS</li> <li>USE END EFFECTORS</li> <li>MECHANICAL HANDS</li> <li>USE END EFFECTORS</li> <li>MECHANICAL IMPEDANCE</li> <li>2308 3203</li> <li>GS</li> <li>IMPEDANCE</li> <li>#MECHANICAL IMPEDANCE</li> <li>RT</li> <li>ATTENUATION</li> <li>DAMPING</li> <li>FRICTION</li> <li>IMPEDANCE MEASUREMENT</li> <li>MECHANICAL MEASUREMENT</li> <li>1406 3404 3408 3501</li> <li>SN</li> <li>(MEASUREMENT OF MECHANICAL PROPERTIES, QUANTITIES OR CONDITIONS)</li> <li>GS</li> <li>#MECHANICAL MEASUREMENT</li> <li>.DISPLACEMENT MEASUREMENT</li> <li>.DRAG MEASUREMENT</li> <li>.FLOW MEASUREMENT</li> <li>.PARTICLE IMAGE VELOCIMETRY</li> <li>.FRICTION MEASUREMENT</li> <li>.PRESSURE MEASUREMENT</li> <li>.STRESS MEASUREMENT</li> <li>.X RAY STRESS MEASUREMENT</li> <li>.THRUST MEASUREMENT</li> </ul> |
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..VELOCITY MEASUREMENT
..PARTICLE IMAGE VELOCIMETRY
..WIND VELOCITY MEASUREMENT
..VIBRATION MEASUREMENT
..WIND MEASUREMENT
..WIND VELOCITY MEASUREMENT
ACCELEROMETERS
ACOUSTIC MEASUREMENT
DEFORMERS
DENSITY MEASUREMENT
DEPTH MEASUREMENT
DYNAMOMETERS
EXTENSOMETERS
FLOWMETERS
% MEASUREMENT
STRAIN GAGES
TENSIOLOGS
TORQUEMETERS
WEIGHT INDICATORS

MECHANICAL OSCILLATORS
1504 2308 3203
GS OSCILLATORS
#MECHANICAL OSCILLATORS
..PENDULUMS
...GYROSCOPIC PENDULUMS
ELECTRIC CHOPPERS
HARMONIC OSCILLATORS
RECIPROCATING
RESONANT VIBRATION
VIBRATION

MECHANICAL PROPERTIES
1704 2308 3408
UF MATERIAL STRENGTH
METEORITE COMPRESSION TESTS
STRENGTH OF MATERIALS
#MECHANICAL PROPERTIES
BRITTLENESS
BULK MODULUS
COLD STRENGTH
COMPRESSIBILITY
COMPRESSIVE STRENGTH
CREEP PROPERTIES
..SHEAR CREEP
..STEADY STATE CREEP
..TENSILE CREEP
CREEP RUPTURE STRENGTH
CREEP STRENGTH
DIMENSIONAL STABILITY
STRUCTURAL STABILITY
...SHELL STABILITY
DUCTILITY
EARTHQUAKE RESISTANCE
ELASTIC PROPERTIES

..AEROELASTICITY
...AEROSERVOELASTICITY
...AEROTHERMOELASTICITY
ANELASTICITY
ELASTOPLASTICITY
..HYDROELASTICITY
..HYPOELASTICITY
..MAGNETOSTRICTION
..MODULUS OF ELASTICITY
...DYNAMIC MODULUS OF ELASTICITY
..PHOTOELASTICITY
...PHOTOVISCOELASTICITY
..PROPORTIONAL LIMIT
..THERMOELASTICITY
...AEROTHERMOELASTICITY
..VISCOELASTICITY
...PHOTOVISCOELASTICITY
...THERMOVISCOELASTICITY
ELECTROSTRICTION
FATIGUE LIFE
FIBER STRENGTH
FLEXIBILITY
FRACTURE STRENGTH
HARDNESS
..KNOOP HARDNESS
..MICROHARDNESS
..ROCKWELL HARDNESS
HIGH STRENGTH
IMPACT STRENGTH
MALLEABILITY
MODULAR RATIOS
NOTCH STRENGTH
PIEZOELECTRICITY
PLASTIC PROPERTIES
ELASTOPLASTICITY
PHOTOPLASTICITY
SUPERPLASTICITY
THERMOPLASTICITY
VISCOPLASTICITY
YIELD POINT
POISSON RATIO
RESILIENCE
SET
SHEAR PROPERTIES
SHEAR STRENGTH
STIFFNESS
STRESS CYCLES
STRESS RATIO
STRESS RELAXATION
TENSILE PROPERTIES
TENSILE STRENGTH
THERMAL RESISTANCE
TOUGHNESS
NOTCH SENSITIVITY
WEAR RESISTANCE

..ABRASION RESISTANCE
WELD STRENGTH
YIELD STRENGTH
..LOAD CARRYING CAPACITY
MICROYIELD STRENGTH
ACOUSTIC PROPERTIES
AGING (MATERIALS)
ANISOTROPY
BUOYANCY
CAST ALLOYS
COEFFICIENTS
COMPRESSION
COMPRESSION LOADS
DEFORMATION
DURABILITY
ELONGATION
FATIGUE (MATERIALS)
FERRITIC STAINLESS STEELS
FIBER ORIENTATION
FLATNESS
HIGH RESISTANCE
HYSTERESIS
IMPEDANCE
INTERFACIAL TENSION
INTERFERENCE FIT
INTERNAL FRICTION
ISOTROPY
J INTEGRAL
LOW RESISTANCE
MATERIALS
MATERIALS TESTS
METALLURGY
MICROMECHANICS
MICROPOROSITY
PEELING
PERMEABILITY
PHYSICAL PROPERTIES
PROPELLANT PROPERTIES
PROPERTIES
RADIATION EFFECTS
RELIABILITY
RIGIDITY
ROUGHNESS
ROUGHNESS
SHEAR STRAIN
SHEAR STRESS
SHOCK RESISTANCE
SOLID MECHANICS
SPECIFICATIONS
SPECIMEN GEOMETRY
STRAIN RATE
STRENGTH
STRESS CONCENTRATION
STRESSES
STRUCTURAL FAILURE

RT
..AEROTHERMOELASTICITY
..ANELASTICITY
..ELASTOPLASTICITY
..HYDROELASTICITY
..HYPOELASTICITY
..MAGNETOSTRICTION
..MODULUS OF ELASTICITY
...DYNAMIC MODULUS OF ELASTICITY
..PHOTOELASTICITY
...PHOTOVISCOELASTICITY
..PROPORTIONAL LIMIT
..THERMOELASTICITY
...AEROTHERMOELASTICITY
..VISCOELASTICITY
...PHOTOVISCOELASTICITY
...THERMOVISCOELASTICITY
ELECTROSTRICTION
FATIGUE LIFE
FIBER STRENGTH
FLEXIBILITY
FRACTURE STRENGTH
HARDNESS
..KNOOP HARDNESS
..MICROHARDNESS
..ROCKWELL HARDNESS
HIGH STRENGTH
IMPACT STRENGTH
MALLEABILITY
MODULAR RATIOS
NOTCH STRENGTH
PIEZOELECTRICITY
PLASTIC PROPERTIES
ELASTOPLASTICITY
PHOTOPLASTICITY
SUPERPLASTICITY
THERMOPLASTICITY
VISCOPLASTICITY
YIELD POINT
POISSON RATIO
RESILIENCE
SET
SHEAR PROPERTIES
SHEAR STRENGTH
STIFFNESS
STRESS CYCLES
STRESS RATIO
STRESS RELAXATION
TENSILE PROPERTIES
TENSILE STRENGTH
THERMAL RESISTANCE
TOUGHNESS
NOTCH SENSITIVITY
WEAR RESISTANCE

..ABRASION RESISTANCE
WELD STRENGTH
YIELD STRENGTH
..LOAD CARRYING CAPACITY
MICROYIELD STRENGTH
ACOUSTIC PROPERTIES
AGING (MATERIALS)
ANISOTROPY
BUOYANCY
CAST ALLOYS
COEFFICIENTS
COMPRESSION
COMPRESSION LOADS
DEFORMATION
DURABILITY
ELONGATION
FATIGUE (MATERIALS)
FERRITIC STAINLESS STEELS
FIBER ORIENTATION
FLATNESS
HIGH RESISTANCE
HYSTERESIS
IMPEDANCE
INTERFACIAL TENSION
INTERFERENCE FIT
INTERNAL FRICTION
ISOTROPY
J INTEGRAL
LOW RESISTANCE
MATERIALS
MATERIALS TESTS
METALLURGY
MICROMECHANICS
MICROPOROSITY
PEELING
PERMEABILITY
PHYSICAL PROPERTIES
PROPELLANT PROPERTIES
PROPERTIES
RADIATION EFFECTS
RELIABILITY
RIGIDITY
ROUGHNESS
ROUGHNESS
SHEAR STRAIN
SHEAR STRESS
SHOCK RESISTANCE
SOLID MECHANICS
SPECIFICATIONS
SPECIMEN GEOMETRY
STRAIN RATE
STRENGTH
STRESS CONCENTRATION
STRESSES
STRUCTURAL FAILURE

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## NASA THESAURUS HIERARCHICAL UPDATE

SUPERCooling  
SURFACE DEFECTS  
SURFACE PROPERTIES  
SURFACE ROUGHNESS  
TEARING  
TEMPERATURE INVERSIONS  
TEXTURES  
TOLERANCES (MECHANICS)  
TRIAXIAL STRESSES  
TRIBOLUMINESCENCE  
WEATHERING

MECHANICAL RESONANCE  
USE RESONANT VIBRATIONMECHANICAL SHOCK  
1704 3203

UF JARRING  
GS #MECHANICAL SHOCK  
RT -HYDRAULIC SHOCK  
ACCELERATION (PHYSICS)  
HIGH ACCELERATION  
HYPERVELOCITY IMPACT  
IMPACT  
IMPACT ACCELERATION  
% SHOCK  
SHOCK ABSORBERS  
SHOCK RESISTANCE  
SHOCK SPECTRA  
SHOCK WAVES  
VIBRATION

MECHANICAL TWINNING  
1704 2308 2601 3203  
GS TWINNING  
#MECHANICAL TWINNING  
RT CRYSTAL DEFECTS  
CRYSTAL GROWTH  
CRYSTAL STRUCTURE  
WORK HARDENING

**% MECHANICS (PHYSICS)**  
**2308**

SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT  
CELESTIAL MECHANICS  
CLASSICAL MECHANICS  
CONTINUUM MECHANICS

%  
 DYNAMICS  
 ELECTROMECHANICS  
 FLIGHT MECHANICS  
 FLUID DYNAMICS  
 FLUID MECHANICS  
 FRACTURE MECHANICS

GAS DYNAMICS  
 %  
 HYDRAULICS  
 HYDRODYNAMICS  
 KINEMATICS  
 KINETICS  
 LOADS (FORCES)  
 %  
 MECHANISM  
 MEGAMECHANICS  
 MICROMECHANICS  
 ORBITAL MECHANICS  
 %  
 PHYSICS  
 QUANTUM MECHANICS  
 %  
 SCIENCE  
 SOLID MECHANICS  
 STATICS  
 STATISTICAL MECHANICS  
 VIRIAL THEOREM  
 WIGNER COEFFICIENTS

**% MECHANISM**

1504 3404 SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT % MACHINERY  
MECHANICAL DEVICES  
% MECHANICS (PHYSICS)  
% METHODOLOGY

## MECHANIZATION

0802 1504 3404  
RT % AUTOMATION

## DATA PROCESSING DEPERSONALIZATION

**% MACHINERY**  
**MAN MACHINE SYSTEMS**

MECHANICAL DEVICES  
% OPERATIONS

SYSTEMS ENGINEERING  
TOOLING  
TOOLS

## MECHANOGRAMS

0501 1406 2308 3501  
GS MEASURING INSTRUMENTS#MECHANOGRAMS  
MEDICAL EQUIPMENT#MECHANOGRAMS  
RECORDING INSTRUMENTS

RT #MECHANODRAMS MUSCULAR FUNCTION

MECHANORECEPTORS  
O408  
GS ANATOMY

```
RT
#MECHANORECEPTORS
#MECHANORECEPTORS
RECEPTORS (PHYSIOLOGY)
.SENSE ORGANS
SENSITOMETRY
```

MECLIZINE

1808 GS HALOGEN COMPOUNDS

```
.CHLORINE COMPOUNDS
.#MECLIZINE
.ORGANIC COMPOUNDS
.CYCLIC COMPOUNDS
..HETEROCYCLIC COMPOUNDS
...AZINES
...#MECLIZINE
PYRAZINES
.AZINES
.#MECLIZINE
```

**MEDIA**

2901 2902 2903 3005 3007  
SN (EXCLUDES COMMUNICATION TECHNIQUES)  
GS #MEDIA

```

..ANISOTROPIC MEDIA
..ANISOTROPIC FLUIDS
..ELASTIC MEDIA
..INTERGALACTIC MEDIA
..INTERPLANETARY MEDIUM
..INTERPLANETARY DUST
..METEOROID DUST CLOUDS
...ZODIACAL DUST
..INTERPLANETARY GAS
RT % CHANNELS

```

**MEDIAN (STATISTICS)**

| RT | 1902 | 1905 | AVERAGE |
|----|------|------|---------|
| 1  | 100  | 100  | 100     |
| 2  | 100  | 100  | 100     |
| 3  | 100  | 100  | 100     |
| 4  | 100  | 100  | 100     |
| 5  | 100  | 100  | 100     |
| 6  | 100  | 100  | 100     |
| 7  | 100  | 100  | 100     |
| 8  | 100  | 100  | 100     |
| 9  | 100  | 100  | 100     |
| 10 | 100  | 100  | 100     |
| 11 | 100  | 100  | 100     |
| 12 | 100  | 100  | 100     |
| 13 | 100  | 100  | 100     |
| 14 | 100  | 100  | 100     |
| 15 | 100  | 100  | 100     |
| 16 | 100  | 100  | 100     |
| 17 | 100  | 100  | 100     |
| 18 | 100  | 100  | 100     |
| 19 | 100  | 100  | 100     |
| 20 | 100  | 100  | 100     |
| 21 | 100  | 100  | 100     |
| 22 | 100  | 100  | 100     |
| 23 | 100  | 100  | 100     |
| 24 | 100  | 100  | 100     |
| 25 | 100  | 100  | 100     |
| 26 | 100  | 100  | 100     |
| 27 | 100  | 100  | 100     |
| 28 | 100  | 100  | 100     |
| 29 | 100  | 100  | 100     |
| 30 | 100  | 100  | 100     |
| 31 | 100  | 100  | 100     |
| 32 | 100  | 100  | 100     |
| 33 | 100  | 100  | 100     |
| 34 | 100  | 100  | 100     |
| 35 | 100  | 100  | 100     |
| 36 | 100  | 100  | 100     |
| 37 | 100  | 100  | 100     |
| 38 | 100  | 100  | 100     |
| 39 | 100  | 100  | 100     |
| 40 | 100  | 100  | 100     |
| 41 | 100  | 100  | 100     |
| 42 | 100  | 100  | 100     |
| 43 | 100  | 100  | 100     |
| 44 | 100  | 100  | 100     |
| 45 | 100  | 100  | 100     |
| 46 | 100  | 100  | 100     |
| 47 | 100  | 100  | 100     |
| 48 | 100  | 100  | 100     |
| 49 | 100  | 100  | 100     |
| 50 | 100  | 100  | 100     |
| 51 | 100  | 100  | 100     |
| 52 | 100  | 100  | 100     |
| 53 | 100  | 100  | 100     |
| 54 | 100  | 100  | 100     |
| 55 | 100  | 100  | 100     |
| 56 | 100  | 100  | 100     |
| 57 | 100  | 100  | 100     |
| 58 | 100  | 100  | 100     |
| 59 | 100  | 100  | 100     |
| 60 | 100  | 100  | 100     |
| 61 | 100  | 100  | 100     |
| 62 | 100  | 100  | 100     |
| 63 | 100  | 100  | 100     |
| 64 | 100  | 100  | 100     |
| 65 | 100  | 100  | 100     |
| 66 | 100  | 100  | 100     |
| 67 | 100  | 100  | 100     |
| 68 | 100  | 100  | 100     |
| 69 | 100  | 100  | 100     |
| 70 | 100  | 100  | 100     |
| 71 | 100  | 100  | 100     |
| 72 | 100  | 100  | 100     |
| 73 | 100  | 100  | 100     |
| 74 | 100  | 100  | 100     |
| 75 | 100  | 100  | 100     |
| 76 | 100  | 100  | 100     |
| 77 | 100  | 100  | 100     |
| 78 | 100  | 100  | 100     |
| 79 | 100  | 100  | 100     |
| 80 | 100  | 100  | 100     |
| 81 | 100  | 100  | 100     |
| 82 | 100  | 100  | 100     |
| 83 | 100  | 100  | 100     |
| 84 | 100  | 100  | 100     |
| 85 | 100  | 100  | 100     |
| 86 | 100  | 100  | 100     |
| 87 | 100  | 100  | 100     |
| 88 | 100  | 100  | 100     |
| 89 | 100  | 100  | 100     |
| 90 | 100  | 100  | 100     |
| 91 | 100  | 100  | 100     |
| 92 | 100  | 100  | 100     |
| 93 | 100  | 100  | 100     |
| 94 | 100  | 100  | 100     |
| 95 | 100  | 100  | 100     |
| 96 | 100  | 100  | 100     |
| 97 | 100  |      |         |

## DISTRIBUTION MOMENTS ERRORS

MEAN  
MODE (STATISTICS)

**NORMALITY  
NORMS**

## QUALITY CONTROL STATISTICAL ANALYSIS

| TESTS                  | %    |
|------------------------|------|
| 1. $2x + 3y = 12$      | 100% |
| 2. $3x + 2y = 12$      | 100% |
| 3. $4x + 5y = 20$      | 100% |
| 4. $5x + 4y = 20$      | 100% |
| 5. $6x + 7y = 42$      | 100% |
| 6. $7x + 6y = 42$      | 100% |
| 7. $8x + 9y = 72$      | 100% |
| 8. $9x + 8y = 72$      | 100% |
| 9. $10x + 11y = 110$   | 100% |
| 10. $11x + 10y = 110$  | 100% |
| 11. $12x + 13y = 156$  | 100% |
| 12. $13x + 12y = 156$  | 100% |
| 13. $14x + 15y = 210$  | 100% |
| 14. $15x + 14y = 210$  | 100% |
| 15. $16x + 17y = 272$  | 100% |
| 16. $17x + 16y = 272$  | 100% |
| 17. $18x + 19y = 342$  | 100% |
| 18. $19x + 18y = 342$  | 100% |
| 19. $20x + 21y = 420$  | 100% |
| 20. $21x + 20y = 420$  | 100% |
| 21. $22x + 23y = 506$  | 100% |
| 22. $23x + 22y = 506$  | 100% |
| 23. $24x + 25y = 600$  | 100% |
| 24. $25x + 24y = 600$  | 100% |
| 25. $26x + 27y = 676$  | 100% |
| 26. $27x + 26y = 676$  | 100% |
| 27. $28x + 29y = 756$  | 100% |
| 28. $29x + 28y = 756$  | 100% |
| 29. $30x + 31y = 840$  | 100% |
| 30. $31x + 30y = 840$  | 100% |
| 31. $32x + 33y = 928$  | 100% |
| 32. $33x + 32y = 928$  | 100% |
| 33. $34x + 35y = 1020$ | 100% |
| 34. $35x + 34y = 1020$ | 100% |
| 35. $36x + 37y = 1116$ | 100% |
| 36. $37x + 36y = 1116$ | 100% |
| 37. $38x + 39y = 1218$ | 100% |
| 38. $39x + 38y = 1218$ | 100% |
| 39. $40x + 41y = 1320$ | 100% |
| 40. $41x + 40y = 1320$ | 100% |
| 41. $42x + 43y = 1428$ | 100% |
| 42. $43x + 42y = 1428$ | 100% |
| 43. $44x + 45y = 1540$ | 100% |
| 44. $45x + 44y = 1540$ | 100% |
| 45. $46x + 47y = 1656$ | 100% |
| 46. $47x + 46y = 1656$ | 100% |
| 47. $48x + 49y = 1776$ | 100% |
| 48. $49x + 48y = 1776$ | 100% |
| 49. $50x + 51y = 1900$ | 100% |
| 50. $51x + 50y = 1900$ | 100% |
| 51. $52x + 53y = 2028$ | 100% |
| 52. $53x + 52y = 2028$ | 100% |
| 53. $54x + 55y = 2160$ | 100% |
| 54. $55x + 54y = 2160$ | 100% |
| 55. $56x + 57y = 2296$ | 100% |
| 56. $57x + 56y = 2296$ | 100% |
| 57. $58x + 59y = 2436$ | 100% |
| 58. $59x + 58y = 2436$ | 100% |
| 59. $60x + 61y = 2580$ | 100% |
| 60. $61x + 60y = 2580$ | 100% |
| 61. $62x + 63y = 2728$ | 100% |
| 62. $63x + 62y = 2728$ | 100% |
| 63. $64x + 65y = 2880$ | 100% |
| 64. $65x + 64y = 2880$ | 100% |
| 65. $66x + 67y = 3036$ | 100% |
| 66. $67x + 66y = 3036$ | 100% |
| 67. $68x + 69y = 3196$ | 100% |
| 68. $69x + 68y = 3196$ | 100% |
| 69. $70x + 71y = 3360$ | 100% |
| 70. $71x + 70y = 3360$ | 100% |
| 71. $72x + 73y = 3528$ | 100% |
| 72. $73x + 72y = 3528$ | 100% |
| 73. $74x + 75y = 3700$ | 100% |
| 74. $75x + 74y = 3700$ | 100% |
| 75. $76x + 77y = 3876$ | 100% |
| 76. $77x + 76y = 3876$ | 100% |
| 77. $78x + 79y = 4056$ | 100% |
| 78. $79x + 78y = 4056$ | 100% |
| 79. $80x + 81y = 4240$ | 100% |
| 80. $81x + 80y = 4240$ | 100% |
| 81. $82x + 83y = 4428$ | 100% |
| 82. $83x + 82y = 4428$ | 100% |
| 83. $84x + 85y = 4620$ | 100% |
| 84. $85x + 84y = 4620$ | 100% |
| 85. $86x + 87y = 4816$ | 100% |
| 86. $87x + 86y = 4816$ | 100% |
| 87. $88x + 89y = 5016$ | 100% |
| 88. $89x + 88y = 5016$ | 100% |
| 89. $90x + 91y = 5220$ | 100% |
| 90. $91x + 90y = 5220$ | 100% |
| 91. $92x + 93y = 5428$ | 100% |
| 92. $93x + 92y = 5428$ | 100% |
| 93. $94x + 95y = 5640$ | 100% |
| 94. $95x + 94y = 5640$ |      |

MEDIASTINUM  
O404 O405  
RT SEPTUM  
TISSUES (BIOLOGY)

MEDIATION  
3402 3403 3406

```

RT  LABOR
MANAGEMENT PLANNING

MEDICAL ELECTRONICS
O405 0501 1002
RT  ECHOENCEPHALOGRAPHY
ELECTROCARDIOGRAPHY
ELECTROENCEPHALOGRAPHY
ELECTROMYOGRAPHY
%  ELECTRONICS
ELECTROPLETHYSMOGRAPHY
ELECTRORETINOGRAPHY

MEDICAL EQUIPMENT
O405 0501
GS  #MEDICAL EQUIPMENT
    .ARTIFICIAL CARDIAC PACEMAKER
    .ARTIFICIAL HEART VALVES
    .BLOOD PUMPS
    .CARDIOTACHOMETERS
    .ENDOSCOPES
    .MECHANOGRAMS
    .PROSTHETIC DEVICES
    .ARTIFICIAL EARS
    .RESPIRATORS
    .STETHOSCOPES
    .STRETCHERS
    .SURGICAL INSTRUMENTS
    .SYRINGES
    .TOURNIQUETS
    .X RAY APPARATUS
    .LIXISCOPES
    .X RAY TUBES
RT  RADIOGRAPHY
DENTISTRY
DIAGNOSIS
ECHOENCEPHALOGRAPHY
ELECTROENCEPHALOGRAPHY
EMERGENCY LIFE SUSTAINING SYSTEMS
%  EQUIPMENT
FIRST AID
FLUOROSCOPY
HOSPITALS
IMBLS
%  MEDICINE
MICROTOMY
MOBILE QUARANTINE FACILITY
THERAPY

MEDICAL PERSONNEL
O405 0502 3404
GS  PERSONNEL
    #MEDICAL PERSONNEL
    ..FLIGHT NURSES
    ..PHYSICIANS

    ..SURGEONS
    ...FLIGHT SURGEONS
RT  % MEDICINE
MEDICAL PHENOMENA
O401 0405
RT  DIVING (UNDERWATER)
PHENOMENOLOGY

MEDICAL SCIENCE
O401 0405
GS  #MEDICAL SCIENCE
    .ANESTHESIOLOGY
    .CARDIOLOGY
    .CLINICAL MEDICINE
    .DENTISTRY
    .DERMATOLOGY
    .ENDOCRINOLOGY
    .EPIDEMIOLOGY
    .GERIATRICS
    .GYNECOLOGY
    .HISTOLOGY
    .IMMUNOLOGY
    .NEUROLOGY
    .NUCLEAR MEDICINE
    .RADIOBIOLOGY
    .OPHTHALMOLOGY
    .ORTHOPEDICS
    .OTOLARYNGOLOGY
    .OTOLOGY
    .PATHOLOGY
    .HUMAN PATHOLOGY
    .PSYCHIATRY
    .NEUROPSYCHIATRY
    .SOCIAL PSYCHIATRY
    .RADIOPATHOLOGY
    .SYMPTOMOLOGY
    .UROLOGY
RT  AEROSPACE MEDICINE
%  BIOLOGY
DIAGNOSIS
DISEASES
FIRST AID
%  MEDICINE
OPTOMETRY
PHARMACOLOGY
PNEUMOTHORAX
PSYCHOPHARMACOLOGY
RADIATION THERAPY
%  SCIENCE
SPORTS MEDICINE
TRANSFUSION

MEDICAL SERVICES

```

```

O405 1101
GS  SERVICES
    #MEDICAL SERVICES
RT  AMBULANCES
    FIRST AID
    INTRAVENOUS PROCEDURES
    MOBILE QUARANTINE FACILITY
    PUBLIC HEALTH

%  MEDICINE
O401 0405
SN  (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS
    LISTED BELOW)
RT  AEROSPACE MEDICINE
    CLINICAL MEDICINE
    MEDICAL EQUIPMENT
    MEDICAL PERSONNEL
    MEDICAL SCIENCE
    NEUROPSYCHIATRY
    PHARMACOLOGY
    PSYCHOPHARMACOLOGY
    RADIOBIOLOGY
    RADIOLOGY
    VETERINARY MEDICINE

MEDITERRANEAN SEA
1305
GS  SEAS
    #MEDITERRANEAN SEA
    ..ADRIATIC SEA
RT  CYPRUS
    GIBRALTAR
    MALTA
    RHONE DELTA (FRANCE)
    SICILY

MEDIUM SCALE INTEGRATION
O902 1001 1002
GS  CIRCUITS
    .INTEGRATED CIRCUITS
    .#MEDIUM SCALE INTEGRATION
    MICROELECTRONICS
    #MEDIUM SCALE INTEGRATION
    ELECTRONIC PACKAGING
    LARGE SCALE INTEGRATION
    MOLECULAR ELECTRONICS
    PRINTED CIRCUITS

MEETINGS
USE  CONFERENCES

MEGALOPOLISES
1303 1305 3402 3403 3401
RT  CITIES

```

|                            |              |              |              |
|----------------------------|--------------|--------------|--------------|
| COMMUNITIES                | SPINNING     | SPINNING     | SPINNING     |
| DEMOCRACY                  | ZONE MELTING | ZONE MELTING | ZONE MELTING |
| INDUSTRIAL AREAS           |              |              |              |
| REGIONAL PLANNING          |              |              |              |
| RESIDENTIAL AREAS          |              |              |              |
| RURAL AREAS                |              |              |              |
| SUBURBAN AREAS             |              |              |              |
| URBAN DEVELOPMENT          |              |              |              |
| URBAN TRANSPORTATION       |              |              |              |
| MEGAMECHANICS              |              |              |              |
| 0802                       |              |              |              |
| RT                         |              |              |              |
| LARGE SPACE STRUCTURES     |              |              |              |
| % MECHANICS (PHYSICS)      |              |              |              |
| STRUCTURAL ANALYSIS        |              |              |              |
| STRUCTURAL ENGINEERING     |              |              |              |
| TRUSSES                    |              |              |              |
| MEISSNER EFFECT            |              |              |              |
| USE DIAMAGNETISM           |              |              |              |
| SUPERCONDUCTIVITY          |              |              |              |
| MELAMINE                   |              |              |              |
| 1808                       |              |              |              |
| GS                         |              |              |              |
| AMINES                     |              |              |              |
| #MELAMINE                  |              |              |              |
| RT                         |              |              |              |
| RESINS                     |              |              |              |
| MELANIN                    |              |              |              |
| 0403                       |              |              |              |
| 1808                       |              |              |              |
| GS                         |              |              |              |
| BIOPOLYMERS                |              |              |              |
| .PROTEINS                  |              |              |              |
| .#MELANIN                  |              |              |              |
| ORGANIC COMPOUNDS          |              |              |              |
| .PROTEINS                  |              |              |              |
| .#MELANIN                  |              |              |              |
| PIGMENTS                   |              |              |              |
| #MELANIN                   |              |              |              |
| DOPA                       |              |              |              |
| RT                         |              |              |              |
| SKIN (ANATOMY)             |              |              |              |
| MELANOIDIN                 |              |              |              |
| 0403                       |              |              |              |
| 1808                       |              |              |              |
| GS                         |              |              |              |
| ACIDS                      |              |              |              |
| .AMINO ACIDS               |              |              |              |
| .#MELANOIDIN               |              |              |              |
| ORGANIC COMPOUNDS          |              |              |              |
| .AMINO ACIDS               |              |              |              |
| .#MELANOIDIN               |              |              |              |
| MELLIN TRANSFORMS          |              |              |              |
| 1902                       |              |              |              |
| GS                         |              |              |              |
| FUNCTIONS (MATHEMATICS)    |              |              |              |
| #MELLIN TRANSFORMS         |              |              |              |
| RT                         |              |              |              |
| INTEGRAL EQUATIONS         |              |              |              |
| KERNEL FUNCTIONS           |              |              |              |
| MELT SPINNING              |              |              |              |
| 0602                       |              |              |              |
| GS                         |              |              |              |
| CRYSTALLIZATION            |              |              |              |
| #MELT SPINNING             |              |              |              |
| MELTS (CRYSTAL GROWTH)     |              |              |              |
| #MELT SPINNING             |              |              |              |
| SOLIDIFICATION             |              |              |              |
| #MELT SPINNING             |              |              |              |
| PHASE TRANSFORMATIONS      |              |              |              |
| RT                         |              |              |              |
| % METALLURGY               |              |              |              |
| MELTING                    |              |              |              |
| 0603                       |              |              |              |
| 1504                       |              |              |              |
| 1704                       |              |              |              |
| UF                         |              |              |              |
| REHEATING                  |              |              |              |
| THAWING                    |              |              |              |
| GS                         |              |              |              |
| PHASE TRANSFORMATIONS      |              |              |              |
| #MELTING                   |              |              |              |
| ..ARC MELTING              |              |              |              |
| ..FUSION (MELTING)         |              |              |              |
| ..LEVITATION MELTING       |              |              |              |
| ..VACUUM MELTING           |              |              |              |
| RT                         |              |              |              |
| ABLATION                   |              |              |              |
| AUFELS (ICE)               |              |              |              |
| BURNTHROUGH (FAILURE)      |              |              |              |
| CASTING                    |              |              |              |
| COAL LIQUEFACTION          |              |              |              |
| CONTAINERLESS MELTS        |              |              |              |
| COOLING                    |              |              |              |
| DEFROSTING                 |              |              |              |
| DEICING                    |              |              |              |
| DROP TRANSFER              |              |              |              |
| EXTRACTION                 |              |              |              |
| FREZZING                   |              |              |              |
| FURNACES                   |              |              |              |
| HEAT OF FUSION             |              |              |              |
| HEATING                    |              |              |              |
| ICE PREVENTION             |              |              |              |
| IMPACT MELTS               |              |              |              |
| INDUCTION HEATING          |              |              |              |
| INJECTION MOLDING          |              |              |              |
| LIQUEFACTION               |              |              |              |
| LIQUID METALS              |              |              |              |
| LIQUID-SOLID INTERFACES    |              |              |              |
| MELTS (CRYSTAL GROWTH)     |              |              |              |
| METAL CUTTING              |              |              |              |
| METAL FOAMS                |              |              |              |
| METALLURGY                 |              |              |              |
| %                          |              |              |              |
| MOLDS                      |              |              |              |
| PHASE CHANGE MATERIALS     |              |              |              |
| PSEUDOPOTENTIALS           |              |              |              |
| %                          |              |              |              |
| SEPARATION                 |              |              |              |
| SMELTING                   |              |              |              |
| SOLAR FURNACES             |              |              |              |
| SPINNING                   |              |              |              |
| 0603                       |              |              |              |
| 2603                       |              |              |              |
| 3304                       |              |              |              |
| UF                         |              |              |              |
| FREZZING POINTS            |              |              |              |
| GS                         |              |              |              |
| THERMODYNAMIC PROPERTIES   |              |              |              |
| .THERMODYNAMIC PROPERTIES  |              |              |              |
| .#MELTING POINTS           |              |              |              |
| RT                         |              |              |              |
| HIGH TEMPERATURE TESTS     |              |              |              |
| LIQUID PHASES              |              |              |              |
| LIQUIDS                    |              |              |              |
| LOW TEMPERATURE TESTS      |              |              |              |
| PHASE DIAGRAMS             |              |              |              |
| REACTION BONDING           |              |              |              |
| SOLID SOLUTIONS            |              |              |              |
| SOLID STATE                |              |              |              |
| SOLIDIFICATION             |              |              |              |
| SOLIDIFIED GASES           |              |              |              |
| SPECIFIC HEAT              |              |              |              |
| TEMPERATURE                |              |              |              |
| TRANSITION TEMPERATURE     |              |              |              |
| MELTS (CRYSTAL GROWTH)     |              |              |              |
| 0602                       |              |              |              |
| GS                         |              |              |              |
| MELTS (CRYSTAL GROWTH)     |              |              |              |
| .CONTAINERLESS MELTS       |              |              |              |
| .IMPACT MELTS              |              |              |              |
| .MELT SPINNING             |              |              |              |
| RT                         |              |              |              |
| ATOMIC STRUCTURE           |              |              |              |
| CRYSTAL GROWTH             |              |              |              |
| CRYSTALLIZATION            |              |              |              |
| FLAT ZONES                 |              |              |              |
| MARANGONI CONVECTION       |              |              |              |
| MELTING                    |              |              |              |
| SEMICONDUCTORS (MATERIALS) |              |              |              |
| MEM (EXCURSION MODULE)     |              |              |              |
| USE                        |              |              |              |
| MARS EXCURSION MODULE      |              |              |              |

PERFORATED SHELLS  
 SCOTCHLITE (TRADEMARK)  
 % SHEETS  
 % SHELLS (STRUCTURAL FORMS)  
 % STRUCTURES  
 THIN WALLED SHELLS  
 WEBS (SUPPORTS)  
  
 MEMBRANE THEORY  
 USE STRUCTURAL ANALYSIS  
  
 MEMBRANES  
 O403 O406 1504  
 UF WEBS (MEMBRANES)  
 GS #MEMBRANES  
 .CELL MEMBRANES (BIOLOGY)  
 .CHOROID MEMBRANES  
 .CONJUNCTIVA  
 .EPICARDIUM  
 .ION EXCHANGE MEMBRANE ELECTROLYTES  
 .MEMBRANE STRUCTURES  
 .SKIN (STRUCTURAL MEMBER)  
 .PERITONEUM  
 .PLEURAE  
 RT % DIAPHRAGMS  
 % FILMS  
 JET MEMBRANE PROCESS  
 % LAYERS  
 OSMOSIS  
 REVERSE OSMOSIS  
 SEPTUM  
 % SHEETS  
 SHELLS (STRUCTURAL FORMS)  
 SKIN (ANATOMY)  
 % WEBS  
 WEBS (SHEETS)  
 WEBS (SUPPORTS)  
  
 MEMORY  
 O408 O410 O801 O802 1504 2102  
 SN (LIMITED TO SENTIENT ORGANISMS--EXCLUDES COMPUTER STORAGE DEVICES AND PLASTIC MEMORY)  
 RT EDUCATION  
 LEARNING  
 MNEMONICS  
 RECOGNITION  
 RETENTION (PSYCHOLOGY)  
 (COMPUTERS)  
 O801 ARCHITECTURE (COMPUTERS)  
 RT COMPUTER DESIGN  
 COMPUTER STORAGE DEVICES  
  
 COMPUTERS  
 HOLE BURNING  
 MAGNETIC DISKS  
 VIDEO DISKS  
  
 MENDELEVIUM  
 O603 1703 2406  
 GS CHEMICAL ELEMENTS  
 .ACTINIDE SERIES  
 ..TRANSURANIUM ELEMENTS  
 ..#MENDELEVIUM  
 .NUCLIDES  
 ..ISOTOPES  
 ...RADIOACTIVE ISOTOPES  
 ....TRANSURANIUM ELEMENTS  
 ....#MENDELEVIUM  
 METALS  
 .ACTINIDE SERIES  
 ..TRANSURANIUM ELEMENTS  
 ..#MENDELEVIUM  
  
 MENINGITIS  
 O405 O408  
 GS DISEASES  
 .INFECTIOUS DISEASES  
 .#MENINGITIS  
 RT ACQUIRED IMMUNODEFICIENCY SYNDROME  
 BACTERIAL DISEASES  
 VIRAL DISEASES  
  
 MENISCI  
 1202  
 GS LIQUID SURFACES  
 #MENISCI  
 RT CURVES (GEOMETRY)  
 LIQUID-GAS MIXTURES  
 LIQUID-SOLID INTERFACES  
 LIQUID-VAPOR INTERFACES  
 % SURFACES  
  
 MENSTRUATION  
 O404 O405 O408  
 RT FEMALES  
 OVARIES  
 PHYSIOLOGY  
  
 MENTAL HEALTH  
 O401 O405 O408 O410  
 GS HEALTH  
 #MENTAL HEALTH  
 RT HUMAN PERFORMANCE  
 INTELLIGENCE  
 NEUROPSYCHIATRY  
 PSYCHOTHERAPY  
 RORSCHACH TESTS  
  
 MENTAL PERFORMANCE  
 O410 O502  
 RT COGNITIVE PSYCHOLOGY  
 CONSCIOUSNESS  
 HUMAN PERFORMANCE  
 HYPERNEA  
 INSPIRATION  
 INTELLECT  
 INTELLIGENCE  
 INTELLIGENCE TESTS  
 IRRATIONALITY  
 LIES  
 OPERATOR PERFORMANCE  
 % PERFORMANCE  
 PSYCHOMOTOR PERFORMANCE  
 STRESS (PSYCHOLOGY)  
 WORKLOADS (PSYCHOPHYSIOLOGY)  
  
 MENTAL STRESS  
 USE STRESS (PSYCHOLOGY)  
  
 MENTHOL  
 O405 1808  
 GS ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..CYCLIC HYDROCARBONS  
 ..#MENTHOL  
 .HYDROCARBONS  
 ..CYCLIC HYDROCARBONS  
 ..#MENTHOL  
 TERPENES  
 #MENTHOL  
  
 MEPROBAMATE  
 O403 O404 1808  
 GS ESTERS  
 #MEPROBAMATE  
  
 MERCAPTAN  
 USE THIOLS  
  
 MERCAPTO COMPOUNDS  
 USE THIOLS  
  
 MERCATOR PROJECTION  
 1303  
 GS GEOMETRY  
 .EUCLIDEAN GEOMETRY  
 ..ANALYTIC GEOMETRY  
 ..#MERCATOR PROJECTION  
 ..PROJECTIVE GEOMETRY  
 ..#MERCATOR PROJECTION  
 RT MAPS

# NASA THESAURUS HIERARCHICAL UPDATE

MERCURE AIRCRAFT  
 O201 3404  
 GS TRANSPORT AIRCRAFT  
 .SHORT HAUL AIRCRAFT  
 .#MERCURE AIRCRAFT  
 RT % AIRCRAFT  
 CARGO AIRCRAFT  
 PASSENGER AIRCRAFT

MERCURY (METAL)  
 O603 1703  
 UF LIQUID MERCURY  
 GS CHEMICAL ELEMENTS  
 #MERCURY (METAL)  
 ..MERCURY ISOTOPES  
 ..MERCURY VAPOR  
 LIQUIDS  
 .LIQUID METALS  
 .#MERCURY (METAL)  
 ...MERCURY VAPOR  
 METALS  
 .LIQUID METALS  
 .#MERCURY (METAL)  
 ...MERCURY VAPOR  
 .TRANSITION METALS  
 .#MERCURY (METAL)

MERCURY (PLANET)  
 3001 3008  
 GS CELESTIAL BODIES  
 .PLANETS  
 ..TERRESTRIAL PLANETS  
 ..#MERCURY (PLANET)  
 RT MERCURY ATMOSPHERE  
 MERCURY SURFACE  
 PLANETARY CRATERS

MERCURY ALLOYS  
 1701 1704  
 GS ALLOYS  
 #MERCURY ALLOYS  
 ..MERCURY AMALGAMS

MERCURY AMALGAMS  
 1701 1704  
 UF AMALGAMS  
 GS ALLOYS  
 .MERCURY ALLOYS  
 .#MERCURY AMALGAMS

MERCURY ARCS  
 2402 2502  
 GS ELECTRIC CURRENT  
 .ELECTRIC DISCHARGES

..ELECTRIC ARCS  
 ..#MERCURY ARCS  
 ARC LAMPS  
 METALLIC PLASMAS  
 RECTIFIERS

MERCURY ATMOSPHERE  
 3001 3008  
 GS ENVIRONMENTS  
 .EXTRATERRESTRIAL ENVIRONMENTS  
 ..PLANETARY ENVIRONMENTS  
 ...PLANETARY ATMOSPHERES  
 ...#MERCURY ATMOSPHERE  
 MERCURY (PLANET)  
 MERCURY SURFACE  
 PLANETARY METEOROLOGY

MERCURY CADMIUM TELLURIDES  
 O603  
 UF CADMIUM MERCURY TELLURIDES  
 GS MERCURY COMPOUNDS  
 .MERCURY TELLURIDES  
 .MERCURY CADMIUM TELLURIDES  
 RT INFRARED DETECTORS  
 PHOTOCONDUCTIVITY  
 PHOTOCONDUCTORS  
 PHOTODIODES

MERCURY COMPOUNDS  
 O603 1804  
 GS #MERCURY COMPOUNDS  
 .MERCURY OXIDES  
 .MERCURY TELLURIDES  
 ..MERCURY CADMIUM TELLURIDES  
 RT % CHEMICAL COMPOUNDS  
 % GROUP 2B COMPOUNDS  
 % METAL COMPOUNDS

MERCURY FLIGHTS  
 3104 3409  
 GS SPACE FLIGHT  
 .MANNED SPACE FLIGHT  
 .#MERCURY FLIGHTS

...MERCURY MA-1 FLIGHT  
 ...MERCURY MA-2 FLIGHT  
 ...MERCURY MA-3 FLIGHT  
 ...MERCURY MA-4 FLIGHT  
 ...MERCURY MA-5 FLIGHT  
 ...MERCURY MA-6 FLIGHT  
 ...MERCURY MA-7 FLIGHT  
 ...MERCURY MA-8 FLIGHT  
 ...MERCURY MA-9 FLIGHT  
 ...MERCURY MR-1 FLIGHT  
 ...MERCURY MR-2 FLIGHT  
 ...MERCURY MR-3 FLIGHT

...MERCURY MR-4 FLIGHT  
 ATLAS LAUNCH VEHICLES  
 MANNED SPACECRAFT  
 SPACE CAPSULES

MERCURY ION ENGINES  
 O301  
 GS ENGINES  
 .ROCKET ENGINES  
 ..ELECTRIC ROCKET ENGINES  
 ...ION ENGINES  
 ...#MERCURY ION ENGINES  
 ELECTROSTATIC ENGINES  
 NUCLEAR PROPULSION  
 NUCLEAR ROCKET ENGINES  
 PLASMA ENGINES

MERCURY ISOTOPES  
 O603 1703 2406  
 GS CHEMICAL ELEMENTS  
 .MERCURY (METAL)  
 .#MERCURY ISOTOPES  
 .NUCLIDES  
 ..ISOTOPES  
 ..#MERCURY ISOTOPES

MERCURY LAMPS  
 O603 1411  
 GS LIGHTING EQUIPMENT  
 .LUMINAIRES  
 .#MERCURY LAMPS  
 LIGHT SOURCES  
 PHOSPHORS  
 STERILIZATION  
 XENON LAMPS

MERCURY MA-1 FLIGHT  
 3104 3409  
 GS SPACE FLIGHT  
 .MANNED SPACE FLIGHT  
 .#MERCURY FLIGHTS  
 ..MERCURY MA-1 FLIGHT  
 RT ATLAS LAUNCH VEHICLES

MERCURY MA-2 FLIGHT  
 3104 3409  
 UF MA-2 MISSION  
 GS SPACE FLIGHT  
 .MANNED SPACE FLIGHT  
 ..MERCURY FLIGHTS  
 ..#MERCURY MA-2 FLIGHT  
 RT ATLAS LAUNCH VEHICLES  
 FAITH 7

MERCURY MA-3 FLIGHT

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

MERCURY COMPOUNDS  
 #MERCURY TELLURIDES  
 ..MERCURY CADMIUM TELLURIDES  
 TELLURIUM COMPOUNDS  
 .TELLURIDES  
 .#MERCURY TELLURIDES

MERCURY VAPOR  
 O603 1203 1703  
 GS CHEMICAL ELEMENTS  
 .MERCURY (METAL)  
 .#MERCURY VAPOR  
 LIQUIDS  
 .LIQUID METALS  
 ..MERCURY (METAL)  
 ..#MERCURY VAPOR  
 METALS  
 .LIQUID METALS  
 ..MERCURY (METAL)  
 ..#MERCURY VAPOR  
 .METAL VAPORS  
 .#MERCURY VAPOR  
 VAPORS  
 .METAL VAPORS  
 .#MERCURY VAPOR  
 CESIUM VAPOR  
 SODIUM VAPOR

RT  
 MERGING ROUTINES  
 O802 1504 3407  
 GS COMPUTER PROGRAMS  
 #MERGING ROUTINES  
 RT % ROUTINES

MERIDIONAL FLOW  
 1202 1203 1204  
 GS FLUID FLOW  
 .GAS FLOW  
 ..AIR FLOW  
 ...AIR CURRENTS  
 ...#MERIDIONAL FLOW  
 RT ATMOSPHERIC CIRCULATION  
 FLOW GEOMETRY  
 WIND (METEOROLOGY)  
 WIND DIRECTION  
 ZONAL FLOW (METEOROLOGY)

MEROMORPHIC FUNCTIONS  
 O402 O404 1902  
 GS ANALYSIS (MATHEMATICS)  
 .COMPLEX VARIABLES  
 .#MEROMORPHIC FUNCTIONS  
 ...ELLIPTIC FUNCTIONS  
 ...RATIONAL FUNCTIONS  
 FUNCTIONS (MATHEMATICS)

#MEROMORPHIC FUNCTIONS  
 ..ELLIPTIC FUNCTIONS  
 ..RATIONAL FUNCTIONS

MERRITT ISLAND (FL)  
 1305 1306  
 GS LANDFORMS  
 .ISLANDS  
 .#MERRITT ISLAND (FL)  
 RT FLORIDA

MERWINITE  
 1805 1806  
 GS CALCIUM COMPOUNDS  
 #MERWINITE  
 MAGNESIUM COMPOUNDS  
 #MERWINITE  
 MINERALS  
 #MERWINITE  
 SILICON COMPOUNDS  
 .SILICATES  
 .#MERWINITE

MESAS  
 1305 1306  
 GS LANDFORMS  
 .TERRACES (LANDFORMS)  
 ..PLATEAUS  
 ..#MESAS  
 ...BUTTES  
 RT FLATS (LANDFORMS)  
 HIGHLANDS  
 MOUNTAINS

MESFETS  
 USE FIELD EFFECT TRANSISTORS

MESH  
 O202 O508 1103 1704 1805 1811 3202  
 RT FABRICS  
 % GRIDS  
 STRANDS  
 WEBBING  
 % WEBS

MESH (MATHEMATICS)  
 USE COMPUTATIONAL GRIDS

MESH GENERATION (MATHEMATICS)  
 USE GRID GENERATION (MATHEMATICS)

MESITYLENE  
 1808  
 GS ORGANIC COMPOUNDS  
 .HYDROCARBONS

.#MESITYLENE

MESOMETEOROLOGY  
 1301  
 GS METEOROLOGY  
 #MESOMETEOROLOGY  
 RT AERONOMY  
 LOWER ATMOSPHERE  
 MICROMETEOROLOGY

MESON RESONANCE  
 2403 2901  
 GS PARTICLES  
 .ELEMENTARY PARTICLES  
 ..BOSONS  
 ...MESONS  
 ...#MESON RESONANCE  
 ....X MESONS  
 ...FERMIONS  
 ..#MESON RESONANCE  
 .NUCLEAR PARTICLES  
 ..BOSONS  
 ...MESONS  
 ...#MESON RESONANCE  
 ....X MESONS  
 #MESON RESONANCE  
 ..X MESONS

RT BARYONS  
 HYPERONS

MESON-MESON INTERACTIONS  
 2401 2403 2405  
 GS PARTICLE INTERACTIONS  
 .ELEMENTARY PARTICLE INTERACTIONS  
 .#MESON-MESON INTERACTIONS  
 RT ELECTROMAGNETIC INTERACTIONS  
 % INTERACTIONS

MESON-NUCLEON INTERACTIONS  
 2304 2403 2405  
 GS PARTICLE INTERACTIONS  
 .ELEMENTARY PARTICLE INTERACTIONS  
 .#MESON-NUCLEON INTERACTIONS  
 RT CHARGED PARTICLES  
 % INTERACTIONS  
 MESONS  
 YUKAWA POTENTIAL

MESONS  
 2401 2403 3009  
 GS PARTICLES  
 .ELEMENTARY PARTICLES  
 ..BOSONS  
 ...#MESONS

....ETA-MESONS  
 ....KAONS  
 ....MESON RESONANCE  
 ....X MESONS  
 ....MUONS  
 ....PIONS  
 ....VECTOR MESONS  
 ....RHO-MESONS  
 ....SIGMA-MESONS  
 .HADRONS  
 ..#MESONS  
 ....KAONS  
 ....MUONS  
 ....OMEGA-MESONS  
 ....VECTOR MESONS  
 ....RHO-MESONS  
 ....SIGMA-MESONS  
 .NUCLEAR PARTICLES  
 ..BOSONS  
 ..#MESONS  
 ....ETA-MESONS  
 ....KAONS  
 ....MESON RESONANCE  
 ....X MESONS  
 ....MUONS  
 ....PIONS  
 ....VECTOR MESONS  
 ....RHO-MESONS  
 ....SIGMA-MESONS  
 BARYONS  
 BOSON FIELDS  
 CHARGED PARTICLES  
 CORPUSCULAR RADIATION  
 COSMIC RAYS  
 GLUONS  
 LEPTONS  
 MESON-NUCLEON INTERACTIONS  
 MUONIUM  
 POMERANCHUK THEOREM  
 STRANGENESS  
  
 MESOPOUSE  
 1302 3009  
 SN (ALTITUDE APPROXIMATELY 90 KM)  
 GS EARTH ATMOSPHERE  
 .MIDDLE ATMOSPHERE  
 ..MESOSPHERE  
 ..#MESOPOUSE  
 RT STRATOPOUSE  
  
 MESOPHILES  
 0404 0407  
 RT MICROORGANISMS  
 PSYCHROPHILES  
 THERMOPHILES

MESOSCALE PHENOMENA  
 1308 2003  
 GS #MESOSCALE PHENOMENA  
 .JET STREAMS (METEOROLOGY)  
 RT ARC CLOUDS  
 METEOROLOGY  
 PHENOMENOLOGY  
 WIND (METEOROLOGY)  
  
 MESOSPHERE  
 1302 2003 3009  
 SN (ALTITUDE RANGE BETWEEN  
 APPROXIMATELY 45 AND 90 KM)  
 GS EARTH ATMOSPHERE  
 .MIDDLE ATMOSPHERE  
 .#MESOSPHERE  
 ..MESOPOUSE  
 RT CHEMOSPHERE  
 EARTH IONOSPHERE  
 HOMOSPHERE  
 SOLAR MESOSPHERE EXPLORER  
 STRATOPOUSE  
  
 MESOZOIC ERA  
 1306  
 GS #MESOZOIC ERA  
 .CRETACEOUS PERIOD  
 RT CRETACEOUS-TERTIARY BOUNDARY  
 GEOCHRONOLOGY  
 PALEONTOLOGY  
 PALEOZOIC ERA  
  
 MESSAGE PROCESSING  
 0802  
 RT AUTOMATIC REPEAT REQUEST  
 COMMUNICATING  
 COMMUNICATION  
 CRYPTOGRAPHY  
 INFORMATION FLOW  
 MESSAGES  
 PACKET TRANSMISSION  
 % PROCESSING  
 SEMANTICS  
 SIGNAL PROCESSING  
 SIGNAL TRANSMISSION  
 SYMBOLS  
  
 MESSAGES  
 0703 3405  
 GS COMMUNICATING  
 .INFORMATION DISSEMINATION  
 .#MESSAGES  
 RT AUTOMATIC REPEAT REQUEST  
 COMMUNICATION THEORY

INFORMATION THEORY  
 INTELLIGIBILITY  
 MESSAGE PROCESSING  
 SEMANTICS  
 SENTENCES  
 SIGNAL TRANSMISSION  
 % SIGNALS  
 SYLLABLES  
 SYMBOLS  
 VOCODERS  
 WORDS (LANGUAGE)  
  
 MESSERSCHMITT ME P-160 AIRCRAFT  
 USE P-160 AIRCRAFT  
  
 MESSERSCHMITT ME P-308 AIRCRAFT  
 USE P-308 AIRCRAFT  
  
 METABOLIC DISEASES  
 0403 0404 0408  
 GS DISEASES  
 #METABOLIC DISEASES  
 RT METABOLISM  
  
 METABOLIC WASTES  
 0403 0406 0505  
 GS WASTES  
 #METABOLIC WASTES  
 ..HUMAN WASTES  
 ...FECES  
 ...URINE  
 ACTIVATED SLUDGE  
 AIR POLLUTION  
 CARBON DIOXIDE  
 COMPOSTING  
 ENVIRONMENT EFFECTS  
 ENVIRONMENT POLLUTION  
 ENVIRONMENTAL SURVEYS  
 EXPIRED AIR  
 LIQUID WASTES  
 MANURES  
 METABOLITES  
 ORGANIC WASTES (FUEL CONVERSION)  
 POLLUTION  
 SEWAGE  
 SEWERS  
 SOLID WASTES  
 WASTE DISPOSAL  
  
 METABOLISM  
 0403 0404 0408  
 GS #METABOLISM  
 .ADRENAL METABOLISM  
 .ASCORBIC ACID METABOLISM  
 .CALCIUM METABOLISM



# NASA THESAURUS HIERARCHICAL UPDATE

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|--------------------------|--------------------|--------------------|---------------------------------|
| .CARBOHYDRATE METABOLISM | RT                 | DRY CELLS          | METALS                          |
| ..HYPERGLYCEMIA          |                    | STORAGE BATTERIES  | OXIDES                          |
| ..HYPOGLYCEMIA           |                    |                    | PAINTS                          |
| .CATABOLISM              |                    |                    | % PLATES                        |
| .ELECTROLYTE METABOLISM  | METAL BONDING      |                    | PLATING                         |
| .ENZYME ACTIVITY         | 1507 1704          |                    | PRIMERS (COATINGS)              |
| ..FERMENTATION           | GS                 |                    | PROTECTIVE COATINGS             |
| .HORMONE METABOLISMS     |                    |                    | SPRAYED COATINGS                |
| .HYDROGEN METABOLISM     |                    |                    |                                 |
| .HYPOMETABOLISM          | RT                 | #METAL BONDING     |                                 |
| .MINERAL METABOLISM      |                    | ADHESION           | METAL COMBUSTION                |
| .NITROGEN METABOLISM     |                    | ADHESIVE BONDING   | 0602 1704 2809 3301             |
| .OXYGEN METABOLISM       |                    | BIMETALS           | GS                              |
| .PHOSPHORUS METABOLISM   |                    | BRAZING            | COMBUSTION                      |
| .PROTEIN METABOLISM      |                    | DIFFUSION WELDING  | #METAL COMBUSTION               |
| ..LIPID METABOLISM       |                    | EXPLOSIVE WELDING  | RT                              |
| ..CALORIC REQUIREMENTS   |                    | HEAT AFFECTED ZONE | FUEL COMBUSTION                 |
| ENZYMOLOGY               |                    | JOINTS (JUNCTIONS) | GAS-METAL INTERACTIONS          |
| HETEROTROPHS             |                    | LAMINATES          | METALS                          |
| HOMEOSTASIS              |                    | RESIN BONDING      | OXIDATION                       |
| KREBS CYCLE              |                    | SOLDERING          | PROPELLANT COMBUSTION           |
| METABOLIC DISEASES       |                    | WELDING            | PYROPHORIC MATERIALS            |
| METABOLITES              | METAL CLUSTERS     |                    | SOLID PROPELLANT COMBUSTION     |
| NUTRITION                | 0602 1703 1802     |                    | SOLID PROPELLANT IGNITION       |
| OBESITY                  | RT                 | AGGLOMERATION      |                                 |
| OSTEOPOROSIS             |                    | ATOMIC CLUSTERS    | % METAL COMPOUNDS               |
| OXYGEN CONSUMPTION       |                    | CHEMISORPTION      | 0603 1704 1804                  |
| PHYSIOLOGY               |                    | CLUMPS             | SN                              |
| RESPIRATION              | % CLUSTERS         |                    | (USE OF A MORE SPECIFIC TERM IS |
| SECRECTIONS              | METALS             |                    | RECOMMENDED--CONSULT THE TERMS  |
| THERMOREGULATION         | MOLECULAR CLUSTERS |                    | LISTED BELOW)                   |
|                          | NUCLEATION         |                    | RT % ALKALI METAL COMPOUNDS     |
|                          |                    |                    | ALUMINUM COMPOUNDS              |
|                          |                    |                    | AMMINES                         |
|                          |                    |                    | ANTIMONY COMPOUNDS              |
|                          |                    |                    | BARIUM COMPOUNDS                |
|                          |                    |                    | BERYLLIUM COMPOUNDS             |
|                          |                    |                    | BISMUTH COMPOUNDS               |
|                          |                    |                    | CADMIUM COMPOUNDS               |
|                          |                    |                    | CALCIUM COMPOUNDS               |
|                          |                    |                    | CERIUM COMPOUNDS                |
|                          |                    |                    | CESIUM COMPOUNDS                |
|                          |                    |                    | % CHEMICAL COMPOUNDS            |
|                          |                    |                    | CHROMIUM COMPOUNDS              |
|                          |                    |                    | COBALT COMPOUNDS                |
|                          |                    |                    | COPPER COMPOUNDS                |
|                          |                    |                    | DYSPROSIUM COMPOUNDS            |
|                          |                    |                    | ERBIUM COMPOUNDS                |
|                          |                    |                    | EUROPIUM COMPOUNDS              |
|                          |                    |                    | GALLIUM COMPOUNDS               |
|                          |                    |                    | GERMANIUM COMPOUNDS             |
|                          |                    |                    | HAFNIUM COMPOUNDS               |
|                          |                    |                    | INDIUM COMPOUNDS                |
|                          |                    |                    | IRIDIUM COMPOUNDS               |
|                          |                    |                    | IRON COMPOUNDS                  |
|                          |                    |                    | LANTHANUM COMPOUNDS             |
|                          |                    |                    | LEAD COMPOUNDS                  |
|                          |                    |                    | LEAD ORGANIC COMPOUNDS          |
|                          |                    |                    | LITHIUM COMPOUNDS               |
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| ..#METAL FLUORIDES            | .CHEMICAL FUELS                | ..SILVER IODIDES               |
| ....ALUMINUM FLUORIDES        | .#METAL FUELS                  | ...STRONTIUM BROMIDES          |
| ....BERYLLIUM FLUORIDES       | ALUMINUM COMPOUNDS             | ...TECHNETIUM FLUORIDES        |
| ....CADMIUM FLUORIDES         | RT BERYLLIUM COMPOUNDS         | ...TITANIUM CHLORIDES          |
| ....CALCIUM FLUORIDES         | BORON COMPOUNDS                | ...TUNGSTEN HALIDES            |
| ....CESIUM FLUORIDES          | CESIUM COMPOUNDS               | ...TUNGSTEN CHLORIDES          |
| ....CHROMIUM FLUORIDES        | GELLED PROPELLANTS             | ...TUNGSTEN FLUORIDES          |
| ....COBALT FLUORIDES          | HYBRID PROPELLANTS             | ...ZINC CHLORIDES              |
| ....COPPER FLUORIDES          | LITHIUM COMPOUNDS              | ...ZIRCONIUM IODIDES           |
| ....LANTHANUM FLUORIDES       | METALS                         | RT % METAL COMPOUNDS           |
| ....LITHIUM FLUORIDES         | SLURRY PROPELLANTS             | METAL HARDENING                |
| ....MAGNESIUM FLUORIDES       | SOLID PROPELLANTS              | USE HARDENING (MATERIALS)      |
| ....NICKEL FLUORIDES          |                                |                                |
| ....PLUTONIUM FLUORIDES       |                                |                                |
| ....PROTACTINIUM FLUORIDES    | METAL GRINDING                 | METAL HYDRIDES                 |
| ....SODIUM FLUORIDES          | 1504 1704 3407                 | O603 1704 1804                 |
| ....STRONTIUM FLUORIDES       | GS GRINDING (MATERIAL REMOVAL) | UF PLUMBANE                    |
| ....THORIUM FLUORIDES         | RT #METAL GRINDING             | GS HYDROGEN COMPOUNDS          |
| ....TUNGSTEN FLUORIDES        | GRINDING TECHNIQUES            | .HYDRIDES                      |
| ....URANIUM FLUORIDES         | GRINDING MACHINES              | .#METAL HYDRIDES               |
| ....ZINC FLUORIDES            | SURFACE FINISHING              | ...ALUMINUM HYDRIDES           |
| RT % METAL COMPOUNDS          |                                | ...ALUMINUM BOROHYDRIDES       |
| METAL FOAMS                   |                                | ...BERYLLIUM HYDRIDES          |
| 1203                          |                                | ...CESIUM HYDRIDES             |
| GS                            | METAL HALIDES                  | ...LITHIUM HYDRIDES            |
| RT                            | ....ALKALI HALIDES             | ...LITHIUM ALUMINUM HYDRIDES   |
| FOAMS                         | ....CESIUM HALIDES             | ...POTASSIUM HYDRIDES          |
| #METAL FOAMS                  | ....CESIUM BROMIDES            | ...SODIUM HYDRIDES             |
| BUBBLES                       | ....CESIUM FLUORIDES           | ...SODIUM COMPOUNDS            |
| FOAMING                       | ....CESIUM IODIDES             |                                |
| LOW GRAVITY MANUFACTURING     | ....POTASSIUM IODIDES          | METAL INSULATOR SEMICONDUCTORS |
| % MATERIALS SCIENCE           | ....SODIUM BROMIDES            | USE MIS (SEMICONDUCTORS)       |
| % METALLURGY                  | ....SODIUM CHLORIDES           |                                |
| SPACE PROCESSING APPLICATIONS | ....SODIUM FLUORIDES           | METAL IONS                     |
| ROCKET                        | ....SODIUM IODIDES             | O603 1804                      |
|                               | ....ALUMINUM CHLORIDES         | GS IONS                        |
| METAL FOILS                   | ....BARIUM FLUORIDES           | #METAL IONS                    |
| 1701 1704                     | ....BERYLLIUM CHLORIDES        | ..FERRIC IONS                  |
| GS                            | ....CADMIUM CHLORIDES          | ..MANGANESE IONS               |
| FOILS (MATERIALS)             | ....CALCIUM CHLORIDES          | RT BARIUM ION CLOUDS           |
| #METAL FOILS                  | ....CHROMIUM BROMIDES          | CATIONS                        |
| RT HONEYCOMB STRUCTURES       | ....COPPER CHLORIDES           | CRYSTAL FIELD THEORY           |
| METALS                        | ....HAFNIUM IODIDES            | ION IMPLANTATION               |
| MULTILAYER INSULATION         | ....IRON CHLORIDES             | ION PLATING                    |
| % SHEETS                      | ....LANTHANUM CHLORIDES        | METALS                         |
|                               | ....LEAD CHLORIDES             | POSITIVE IONS                  |
| METAL FORGING                 | ....LITHIUM CHLORIDES          |                                |
| USE FORGING                   | ....MAGNESIUM BROMIDES         | METAL JOINTS                   |
|                               | ....NIOBIUM IODIDES            | 1507 3203                      |
| METAL FORMING                 | ....POTASSIUM BROMIDES         | GS JOINTS (JUNCTIONS)          |
| USE FORMING TECHNIQUES        | ....POTASSIUM CHLORIDES        | #METAL JOINTS                  |
| METAL WORKING                 | ....SILVER HALIDES             | ..SOLDERED JOINTS              |
|                               | ....SILVER BROMIDES            | ..WELDED JOINTS                |
| METAL FUELS                   | ....SILVER CHLORIDES           | ...SPOT WELDS                  |
| 1704 2702 2809                |                                | RT BUTT JOINTS                 |
| GS FUELS                      |                                |                                |

EXPLOSIVE WELDING  
LAP JOINTS  
RIVETED JOINTS  
SEAMS (JOINTS)

METAL MATRIX COMPOSITES  
1704 1801 1805 1809  
GS  
COMPOSITE MATERIALS  
#METAL MATRIX COMPOSITES  
..ALUMINUM BORON COMPOSITES  
..ALUMINUM GRAPHITE COMPOSITES  
..BORSIC (TRADENAME)  
..EUTECTIC COMPOSITES  
..ARAMID FIBER COMPOSITES  
BORON FIBERS  
ELECTRODEPOSITION  
FIBER COMPOSITES  
FIBERS  
FUNCTIONALLY GRADIENT MATERIALS  
HYBRID COMPOSITES  
% MATERIALS  
% MATRICES  
MATRIX MATERIALS  
MONOTECTIC ALLOYS  
PARTICULATE REINFORCED COMPOSITES  
PLASMA SPRAYING  
POWDER METALLURGY  
REINFORCING FIBERS  
RESIN MATRIX COMPOSITES  
SQUEEZE CASTING  
WHISKER COMPOSITES

METAL NITRIDES  
0603  
GS  
NITROGEN COMPOUNDS  
.NITRIDES  
..METAL NITRIDES  
...ALUMINUM NITRIDES  
...BERYLLIUM NITRIDES  
...GALLIUM NITRIDES  
...TANTALUM NITRIDES  
...TITANIUM NITRIDES  
...ZIRCONIUM NITRIDES  
RT  
TRANSITION METALS

METAL ORGANIC CHEMICAL VAPOR DEPOSITION  
USE  
METALORGANIC CHEMICAL VAPOR  
DEPOSITION

METAL OXIDE SEMICONDUCTORS  
0603 1704 1804 2602  
UF  
MOS (SEMICONDUCTORS)  
GS  
ELECTRONIC EQUIPMENT  
.SOLID STATE DEVICES  
..SEMICONDUCTOR DEVICES

..#METAL OXIDE SEMICONDUCTORS  
....CMOS  
....ITO (SEMICONDUCTORS)  
....SOS (SEMICONDUCTORS)  
SEMICONDUCTORS (MATERIALS)  
#METAL OXIDE SEMICONDUCTORS  
..CMOS  
..ITO (SEMICONDUCTORS)  
..SOS (SEMICONDUCTORS)  
CAPACITANCE-VOLTAGE CHARACTERISTICS  
ION IMPLANTATION  
RECTIFIERS  
SOI (SEMICONDUCTORS)

RT  
METAL OXIDES  
0603 1704 1804  
GS  
CHALCOGENIDES  
.OXIDES  
..#METAL OXIDES  
...ALKALINE EARTH OXIDES  
...BARIUM OXIDES  
...BERYLLIUM OXIDES  
...CALCIUM OXIDES  
...AKERMANITE  
...MAGNESIUM OXIDES  
...AKERMANITE  
...PERICLASE  
...ALUMINUM OXIDES  
...SAPPHIRE  
...BISMUTH OXIDES  
...CERIUM OXIDES  
...CESIUM OXIDES  
...CHROMIUM OXIDES  
...COBALT OXIDES  
...COPPER OXIDES  
...GALLIUM OXIDES  
...HAFNIUM OXIDES  
...IRON OXIDES  
...HEMATITE  
...ILMENITE  
...MAGNETITE  
...LANTHANUM OXIDES  
...LEAD OXIDES  
...LITHIUM OXIDES  
...MANGANESE OXIDES  
...HOPCALITE (TRADEMARK)  
...MERCURY OXIDES  
...MIXED OXIDES  
...BSCCO SUPERCONDUCTORS  
...YBCO SUPERCONDUCTORS  
...MOLYBDENUM OXIDES  
...NICKEL OXIDES  
...NIOBIUM OXIDES  
...PLATINUM OXIDES  
...PLUTONIUM OXIDES

...POTASSIUM OXIDES  
...SCANDIUM OXIDES  
...SILVER OXIDES  
...SODIUM PEROXIDES  
...STRONTIUM OXIDES  
...TANTALUM OXIDES  
...THORIUM OXIDES  
...TIN OXIDES  
...TITANIUM OXIDES  
...ANATASE  
...ILMENITE  
...RUTILE  
...TUNGSTEN OXIDES  
...SCHEELITE  
...URANIUM OXIDES  
...VANADIUM OXIDES  
...YTTRIUM OXIDES  
...ZINC OXIDES  
...ZIRCONIUM OXIDES  
...YTTRIA-STABILIZED ZIRCONIA  
CATHODIC COATINGS  
HIGH TEMPERATURE SUPERCONDUCTORS  
% METAL COMPOUNDS  
OXIDE FILMS  
VANADATES

RT  
METAL PARTICLES  
0603 1704 1804  
GS  
PARTICLES  
#METAL PARTICLES  
..METAL POWDER  
...PLATINUM BLACK  
...POWDERED ALUMINUM  
...SINTERED ALUMINUM POWDER  
PARTICULATE REINFORCED COMPOSITES  
POWDER METALLURGY  
SCRAP  
SPUTTERING

RT  
METAL PLATES  
0102 0104 1507 1704 3203  
UF  
PLATE (METAL)  
GS  
STRUCTURAL MEMBERS  
.PLATES (STRUCTURAL MEMBERS)  
..METAL PLATES  
...BOILER PLATE  
ARMOR  
BARS  
BILLETS  
FLANGES  
FLAT PLATES  
GIRDER WEBS  
PARALLEL PLATES  
% PLATES  
RECTANGULAR PLATES

# NASA THESAURUS HIERARCHICAL UPDATE

SLABS  
THICK PLATES  
THIN PLATES

METAL POLISHING  
1504 1704 3404  
UF POLISHED METALS  
GS POLISHING  
#METAL POLISHING  
..ELECTROPOLISHING  
RT CLEANING  
SURFACE FINISHING

METAL POWDER  
1701 1704  
UF POWDERED METALS  
GS PARTICLES  
.METAL PARTICLES  
..METAL POWDER  
...PLATINUM BLACK  
....POWDERED ALUMINUM  
.....SINTERED ALUMINUM POWDER  
..POWDER (PARTICLES)  
.#METAL POWDER  
...PLATINUM BLACK  
...POWDERED ALUMINUM  
....SINTERED ALUMINUM POWDER

RT ATOMIZING  
BEARING ALLOYS  
COMMINUTION  
COMPRESSIBILITY  
COMPRESSING  
ELECTRODEPOSITION  
FLAKES  
LIQUID PHASE SINTERING  
METALS  
MIXING  
POROUS MATERIALS  
POWDER METALLURGY  
REDUCTION (CHEMISTRY)  
SINTERING  
SIZE SEPARATION

METAL PROPELLANTS  
1704 2702 2809  
GS PROPELLANTS  
.ROCKET PROPELLANTS  
..SOLID ROCKET PROPELLANTS  
...METAL PROPELLANTS  
..SOLID PROPELLANTS  
...SOLID ROCKET PROPELLANTS  
...METAL PROPELLANTS  
ALUMINUM COMPOUNDS  
BERYLLIUM COMPOUNDS  
BORON COMPOUNDS

GELLED PROPELLANTS  
GELLED ROCKET PROPELLANTS  
HYBRID PROPELLANTS  
MONOPROPELLANTS  
SLURRY PROPELLANTS

METAL SHEETS  
1504 1704  
UF SHEET METAL  
RT PLATES (STRUCTURAL MEMBERS)  
% SHEETS

METAL SHELLS  
0102 0104 1704 3203  
GS SHELLS (STRUCTURAL FORMS)  
#METAL SHELLS  
RT CIRCULAR SHELLS  
CYLINDRICAL SHELLS  
HEMISPHERICAL SHELLS  
HULLS (STRUCTURES)  
MEMBRANE STRUCTURES  
ORTHOTROPIC SHELLS  
REINFORCED SHELLS  
SKIN (STRUCTURAL MEMBER)  
SPHERICAL SHELLS  
THIN WALLED SHELLS  
TOROIDAL SHELLS

METAL SPINNING  
1504 1704 3404 3407  
UF SPIN FORGING  
GS SPINNING (METALLURGY)  
FORMING TECHNIQUES  
#METAL SPINNING  
..HYDROSPINNING  
METAL WORKING  
#METAL SPINNING  
..HYDROSPINNING  
SPIN  
#METAL SPINNING  
..HYDROSPINNING  
RT COLD WORKING  
EXTRUDING  
HOT WORKING

METAL SPRAYING  
1504 1701 1704 3407  
GS SPRAYING  
#METAL SPRAYING  
RT ARC SPRAYING  
COATING  
COATINGS  
FLAME SPRAYING  
METALLIZING  
SURFACE FINISHING

METAL STRIPS  
1504 1507 1704 3404  
RT BILLETS  
RIBBONS  
STRAKES  
% STRIP

METAL SURFACES  
1704 3203  
RT CRACK INITIATION  
CRYSTAL SURFACES  
EROSION  
GAS-SOLID INTERFACES  
LIQUID-SOLID INTERFACES  
OXIDE FILMS  
SOLID SURFACES  
SURFACE FINISHING  
SURFACE PROPERTIES  
SURFACE REACTIONS  
% SURFACES

METAL VAPOR LASERS  
0709  
GS STIMULATED EMISSION DEVICES  
.LASERS  
.#METAL VAPOR LASERS  
LASER MATERIALS  
LASER MICROSCOPY  
OPTICAL PUMPING

METAL VAPORS  
0603 1203 1704  
GS METALS  
#METAL VAPORS  
..MERCURY VAPOR  
..SODIUM VAPOR  
VAPORS  
#METAL VAPORS  
..MERCURY VAPOR  
..SODIUM VAPOR  
ALKALI METALS  
ALKALI VAPOR LAMPS  
GAS-METAL INTERACTIONS  
HEAT TRANSFER  
LIQUID METALS  
VAPOR DEPOSITION

RT WHISKER REINFORCEMENT  
USE WHISKER COMPOSITES

METAL WORKING  
1504 1507 1704 3404 3407  
SN (METAL DEFORMATION FOR CHANGING  
SHAPE AND FOR PROPERTIES--EXCLUDES

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UF | CASTING, CUTTING, DEPOSITION<br>PROCESS AND MACHINING)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | STRETCHING<br>SWAGING<br>TEMPERING<br>WINDING<br>WORK HARDENING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | METAL-OXIDE-METAL SEMICONDUCTORS<br>USE MDM (SEMICONDUCTORS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| GS | #METAL FORMING<br>.AUSFORMING<br>.BULGING<br>.CLADDING<br>.COINING<br>.EXPLOSIVE FORMING<br>.FORGING<br>.HYDROFORMING<br>.MAGNETIC FORMING<br>.METAL DRAWING<br>.METAL SPINNING<br>..HYDROSPINNING<br>.SIZING (SHAPING)<br>BRAKES (FORMING OR BENDING)<br>% BREAKDOWN                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | METAL-SEMICONDUCTOR-METAL SEMICONDUCTORS<br>USE MSM (SEMICONDUCTORS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RT | %<br>CASTING<br>COLD PRESSING<br>COLD ROLLING<br>COLD WORKING<br>DECARBURIZATION<br>DEEP DRAWING<br>DIMPLING<br>ELECTROHYDRAULIC FORMING<br>ELECTROMAGNETIC HAMMERS<br>EXPLOSIVE WELDING<br>EXTRUDING<br>FLATTENING<br>FORMING TECHNIQUES<br>HARDENING (MATERIALS)<br>HOT ISOSTATIC PRESSING<br>HOT PRESSING<br>HOT WORKING<br>LASER APPLICATIONS<br>LEVELING<br>MACHINING<br>MALLEABILITY<br>% METALLURGY<br>MICROMACHINING<br>PEENING<br>PERFORATING<br>PIERCING<br>PLASMA ARC CUTTING<br>PRESSING (FORMING)<br>PYROMETALLURGY<br>% REDUCTION<br>% ROLL FORMING<br>% ROLLING<br>SHEARING<br>SHOT PEENING<br>SQUEEZE CASTING<br>STAMPING<br>STRETCH FORMING | METAL-BARRIER-METAL JUNCTIONS<br>USE MBM JUNCTIONS<br>METAL-GAS SYSTEMS<br>O602 O603 1203 1704<br>RT<br>GAS LUBRICANTS<br>GAS-METAL INTERACTIONS<br>GASES<br>METALS<br>% SYSTEMS<br>VAPOR PHASES<br>METAL-INSULATOR-METAL DIODES<br>USE MIM DIODES<br>METAL-INSULATOR-METAL SEMICONDUCTORS<br>USE MIM (SEMICONDUCTORS)<br>METAL-METAL BONDING<br>O602 1507 1701 1704<br>GS BONDING<br>..METAL BONDING<br>..#METAL-METAL BONDING<br>RT ADHESIVE BONDING<br>ADHESIVES<br>DIFFUSION WELDING<br>EXPLOSIVE WELDING<br>HEAT AFFECTED ZONE<br>INERTIA BONDING<br>RESIN BONDING<br>SOLDERING<br>WELDING<br>METAL-NITRIDE-OXIDE-SEMICONDUCTORS<br>2602<br>GS ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>..#METAL-NITRIDE-OXIDE-SEMICONDUCTOR<br>SEMICONDUCTORS (MATERIALS)<br>#METAL-NITRIDE-OXIDE-SEMICONDUCTORS<br>RT CHIPS (MEMORY DEVICES)<br>METAL-NITRIDE-OXIDE-SILICON<br>2602<br>UF<br>GS MNOS<br>SEMICONDUCTORS (MATERIALS)<br>#METAL-NITRIDE-OXIDE-SILICON | METAL-WATER REACTIONS<br>O603 O604 1702<br>GS CHEMICAL REACTIONS<br>#METAL-WATER REACTIONS<br>RT CORROSION<br>ELECTROCHEMICAL CORROSION<br>EROSION<br>PITTING<br>RUSTING<br>SURFACE REACTIONS<br>METALLIC GLASSES<br>O603<br>GS GLASS<br>#METALLIC GLASSES<br>RT GLASS COATINGS<br>GLASS FIBERS<br>OPTICAL PROPERTIES<br>SILICON DIOXIDE<br>SPIN GLASS<br>VITREOUS MATERIALS<br>METALLIC HYDROGEN<br>O603 1807 2603<br>GS CHEMICAL ELEMENTS<br>.HYDROGEN<br>..HYDROGEN ISOTOPES<br>..#METALLIC HYDROGEN<br>GASES<br>.HYDROGEN<br>..HYDROGEN ISOTOPES<br>..#METALLIC HYDROGEN<br>RT CRITICAL TEMPERATURE<br>SOLID PHASES<br>SOLID STATE<br>SOLIDIFIED GASES<br>SOLIDS<br>METALLIC PLASMAS<br>1703 1704 2502<br>GS PARTICLES<br>.CHARGED PARTICLES<br>..ENERGETIC PARTICLES<br>...PLASMAS (PHYSICS)<br>...#METALLIC PLASMAS<br>....CESIUM PLASMA<br>RT ELECTRON PLASMA<br>MERCURY ARCS<br>PLASMA SHEATHS |

# NASA THESAURUS HIERARCHICAL UPDATE

METALLIC STARS  
 3001 3002  
 GS CELESTIAL BODIES  
 .STARS  
 .#METALLIC STARS  
 ABUNDANCE  
 RT CHEMICAL COMPOSITION  
 METALLICITY  
 STELLAR ATMOSPHERES  
 STELLAR STRUCTURE

METALLICITY  
 0601 3009  
 RT ABUNDANCE  
 CHEMICAL ANALYSIS  
 CHEMICAL COMPOSITION  
 GALACTIC CLUSTERS  
 GALAXIES  
 GLOBAL CLUSTERS  
 HYDROGEN  
 INTERSTELLAR MATTER  
 MASS RATIOS  
 METALLIC STARS  
 METALS  
 SPECTROSCOPIC ANALYSIS  
 STAR CLUSTERS  
 STARS

METALLIZING  
 1704 3407  
 GS COATING  
 #METALLIZING  
 COATINGS  
 #METALLIZING  
 CLADDING  
 ELECTROPLATING  
 FINISHES  
 FLAME SPRAYING  
 LAMINATES  
 METAL COATINGS  
 METAL FILMS  
 METAL SPRAYING  
 PLATING  
 SPRAYING  
 SUBSTRATES  
 VAPOR DEPOSITION

METALLOGRAPHY  
 1704  
 RT ABRASION  
 ALLOYS  
 ANISOTROPY  
 CRYSTAL LATTICES  
 CRYSTALLOGRAPHY

ELECTROPOLISHING  
 ETCHING  
 FERROGRAPHY  
 INCLUSIONS  
 ISOTROPY  
 % MATERIALS TESTS  
 METAL CRYSTALS  
 % METALLURGY  
 METALS  
 MICROPOROSITY  
 MICROSCOPES  
 MICROSTRUCTURE  
 MUSHY ZONES  
 ORDER-DISORDER TRANSFORMATIONS  
 PHOTOMICROGRAPHY  
 POLISHING  
 RADIOGRAPHY  
 REPLICAS  
 SOLID SUSPENSIONS  
 TIME TEMPERATURE PARAMETER  
 VIBRATORY POLISHING  
 WIDMANSTATTEN STRUCTURE  
 X RAY DIFFRACTION

METALLOIDS  
 0603 1703 1807  
 UF SEMIMETALS  
 GS CHEMICAL ELEMENTS  
 #METALLOIDS  
 ..ANTIMONY  
 ..ANTIMONY ISOTOPES  
 ..ARSENIC  
 ..ARSENIC ISOTOPES  
 ..BORON  
 ..BORON ISOTOPES  
 ..BORON 10  
 ..GERMANIUM  
 ..GERMANIUM ISOTOPES  
 ..POLONIUM  
 ..POLONIUM ISOTOPES  
 ....POLONIUM 208  
 ....POLONIUM 209  
 ....POLONIUM 210  
 ..SILICON  
 ..AMORPHOUS SILICON  
 ..SILICON ISOTOPES  
 ..TELLURIUM  
 ...TELLURIUM ISOTOPES  
 ALLOYS  
 RT ARSENIC ALLOYS  
 BORON ALLOYS  
 INTERMETALLICS  
 METALS  
 ORGANOMETALLIC COMPOUNDS  
 SEMICONDUCTORS (MATERIALS)

METALLOGRAPHY  
 1808 1810  
 RT ORGANOMETALLIC COMPOUNDS  
 % POLYMERS

METALLOSILOXANE POLYMER  
 1808 1810  
 RT ORGANOMETALLIC COMPOUNDS  
 #METALLOXANE POLYMER  
 RT % POLYMERS

METALLOXANE POLYMER  
 1808 1810  
 GS ORGANOMETALLIC COMPOUNDS  
 RT % POLYMERS

% METALLURGY  
 1704  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ALLOYING  
 ALLOYS  
 BENEFICIATION  
 CASTING  
 COATING  
 COATINGS  
 CORROSION  
 CRYSTALLOGRAPHY  
 DISPERSION STRENGTHENING  
 DUPLEX OPERATION  
 FERROUS METALS  
 FOUNDRIES  
 FRACTOGRAPHY  
 FURNACES  
 HARDENING (MATERIALS)  
 HEAT AFFECTED ZONE  
 HEAT TREATMENT  
 HYDROMETALLURGY  
 LEVITATION MELTING  
 LIGHT ALLOYS  
 MECHANICAL PROPERTIES  
 MELT SPINNING  
 MELTING  
 METAL COATINGS  
 METAL FOAMS  
 METAL WORKING  
 METALLOGRAPHY  
 METALS  
 NONFERROUS METALS  
 % PHYSICAL SCIENCES  
 POWDER METALLURGY  
 PYROMETALLURGY  
 RAPID QUENCHING (METALLURGY)  
 RECRYSTALLIZATION  
 % SCIENCE

[illegible]



```

...SCANDIUM
...SCANDIUM ISOTOPES
...TERBIUM
...TERBIUM ISOTOPES
...THULIUM
...THULIUM ISOTOPES
...YTTERBIUM
...YTTERBIUM ISOTOPES
...YTRIUM
...YTRIUM ISOTOPES
..REFRACTORY METALS
..CHROMIUM
...CHROMIUM ISOTOPES
..IRIDIUM
...IRIDIUM ISOTOPES
..MOLYBDENUM
..NIOBium
...NIOBium ISOTOPES
...NIOBium 95
...OSMIUM
...OSMIUM ISOTOPES
...RHENIUM
...RHENIUM ISOTOPES
...TANTALUM
...TANTALUM ISOTOPES
...TUNGSTEN
...TUNGSTEN ISOTOPES
..STRONTIUM
...STRONTIUM ISOTOPES
...STRONTIUM 85
...STRONTIUM 87
...STRONTIUM 89
...STRONTIUM 90
..THALLIUM
..THALLIUM ISOTOPES
..TIN
..TIN ISOTOPES
..TRANSITION METALS
...CADMIUM
...CADMIUM ISOTOPES
...CHROMIUM
...CHROMIUM ISOTOPES
...COBALT
...COBALT ISOTOPES
...COBALT 58
...COBALT 60
...COPPER
...COPPER ISOTOPES
...GOLD
...GOLD ISOTOPES
...GOLD 198
...HAFNIUM
...HAFNIUM ISOTOPES
...IRIDIUM
...IRIDIUM ISOTOPES

...IRON
...IRON ISOTOPES
...IRON 57
...IRON 58
...IRON 59
...MANGANESE
...MANGANESE ISOTOPES
...MERCURY (METAL)
...MOLYBDENUM
...NICKEL
...NICKEL ISOTOPES
...NIOBium
...NIOBium ISOTOPES
...NIOBium 95
...OSMIUM
...OSMIUM ISOTOPES
...PALLADIUM
...PLATINUM
...PLATINUM ISOTOPES
...RHENIUM
...RHENIUM ISOTOPES
...RHODIUM
...RHODIUM ISOTOPES
...RUTHENIUM
...RUTHENIUM ISOTOPES
...SCANDIUM
...SCANDIUM ISOTOPES
...SILVER
...SILVER ISOTOPES
...TANTALUM
...TANTALUM ISOTOPES
...TECHNETIUM
...TECHNETIUM ISOTOPES
...TITANIUM
...TITANIUM ISOTOPES
...TUNGSTEN
...TUNGSTEN ISOTOPES
...VANADIUM
...VANADIUM ISOTOPES
...YTTRIUM
...YTTRIUM ISOTOPES
...ZINC
...ZINC ISOTOPES
...ZIRCONIUM
...ZIRCONIUM ISOTOPES
...ZIRCONIUM 95
..ULTRAPURE METALS
..URANIUM PLASMAS
..ALLOYS
RT
ANTIMONY
ARSENIC
ARSENIC ISOTOPES
BIMETALS
BORSIC (TRADENAME)
CERMETS

..IRON
...IRON ISOTOPES
...IRON 57
...IRON 58
...IRON 59
...MANGANESE
...MANGANESE ISOTOPES
...MERCURY (METAL)
...MOLYBDENUM
...NICKEL
...NICKEL ISOTOPES
...NIOBium
...NIOBium ISOTOPES
...NIOBium 95
...OSMIUM
...OSMIUM ISOTOPES
...PALLADIUM
...PLATINUM
...PLATINUM ISOTOPES
...RHENIUM
...RHENIUM ISOTOPES
...RHODIUM
...RHODIUM ISOTOPES
...RUTHENIUM
...RUTHENIUM ISOTOPES
...SCANDIUM
...SCANDIUM ISOTOPES
...SILVER
...SILVER ISOTOPES
...TANTALUM
...TANTALUM ISOTOPES
...TECHNETIUM
...TECHNETIUM ISOTOPES
...TITANIUM
...TITANIUM ISOTOPES
...TUNGSTEN
...TUNGSTEN ISOTOPES
...VANADIUM
...VANADIUM ISOTOPES
...YTTRIUM
...YTTRIUM ISOTOPES
...ZINC
...ZINC ISOTOPES
...ZIRCONIUM
...ZIRCONIUM ISOTOPES
...ZIRCONIUM 95
..ULTRAPURE METALS
..URANIUM PLASMAS
..ALLOYS
RT
ANTIMONY
ARSENIC
ARSENIC ISOTOPES
BIMETALS
BORSIC (TRADENAME)
CERMETS

CHEMICAL ELEMENTS
COMPOSITE MATERIALS
CONDUCTORS
EUTECTIC COMPOSITES
GADOLINIUM ALLOYS
INTERMETALLICS
ISOTOPES
LIGHT ALLOYS
LIQUID ALLOYS
METAL CLUSTERS
METAL COATINGS
METAL COMBUSTION
METAL COMPOUNDS
%
METAL CRYSTALS
METAL FILMS
METAL FOILS
METAL FUELS
METAL IONS
METAL POWDER
METAL-GAS SYSTEMS
METALLICITY
METALLOGRAPHY
METALLOIDS
% METALLURGY
MONOTECTIC ALLOYS
PALLADIUM COMPOUNDS
POLONIUM
POLONIUM ISOTOPES
POLONIUM 208
POLONIUM 209
POLONIUM 210
STRATEGIC MATERIALS
SYNTECTIC ALLOYS

METAMORPHIC ROCKS
1306
GS
ROCKS
#METAMORPHIC ROCKS
..QUARTZITE
RT
METAMORPHISM (GEOLOGY)

METAMORPHISM (GEOLOGY)
1306 2601
RT
CONTACTS (GEOLOGY)
METAMORPHIC ROCKS
PHASE TRANSFORMATIONS
ROCKS

METASTABILITY
USE
METASTABLE STATE

METASTABLE ATOMS
O603 2601
GS
ATOMS
#METASTABLE ATOMS

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[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

```

RT    CARBONACEOUS METEORITES
      COSMOCHEMISTRY
      IRON METEORITES
      KAMACITE
      METEORITES
      SCHREIBERSITE
      STONY METEORITES
      TEKTIITES
      TROILITE

METEORITIC DAMAGE
  3005 3009 3110 3201
  GS    DAMAGE
        .IMPACT DAMAGE
        .#METEORITIC DAMAGE
RT % BOMBARDMENT
    CRATERING
    EJECTA
    HYPERVELOCITY IMPACT
    MARS CRATERS
    METEORITE COLLISIONS
    METEORITE CRATERS
    METEOROID HAZARDS
    METEOROID PROTECTION
    PROJECTILE CRATERING

METEORITIC DIAMONDS
  1805 2601 3005
  GS    DIAMONDS
        #METEORITIC DIAMONDS
RT    UREILITES

METEORITIC DUST
  USE MICROMETEORIDS

METEORITIC IONIZATION
  USE ATMOSPHERIC IONIZATION
    METEOR TRAILS

METEORITIC MICROSTRUCTURES
  0601 2601 3005
  GS    MICROSTRUCTURE
        #METEORITIC MICROSTRUCTURES
RT    CHONDRULE
      IRON METEORITES
      METEORITES
      STONY METEORITES
      TEKTIITES
      WIDMANSTATTEN STRUCTURE

METEOROID CONCENTRATION
  3001 3005 3009
  GS    COMPOSITION (PROPERTY)
        .CONCENTRATION (COMPOSITION)
        .#METEOROID CONCENTRATION

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      DENSITY (NUMBER/VOLUME)
      #METEOROID CONCENTRATION
RT    FLUX DENSITY
      MASS DISTRIBUTION
      SPATIAL DISTRIBUTION
      SPORADIC METEORIDS

METEOROID CRATERS
  USE METEORITE CRATERS

METEOROID DUST CLOUDS
  2403 3005 3009
  GS    CELESTIAL BODIES
        .METEORIDS
        .MICROMETEORIDS
        .#METEOROID DUST CLOUDS
        ....ZODIACAL DUST
        MEDIA
        .INTERPLANETARY MEDIUM
        .INTERPLANETARY DUST
        .#METEOROID DUST CLOUDS
        ....ZODIACAL DUST
        PARTICLES
        .DUST
        .COSMIC DUST
        .INTERPLANETARY DUST
        .#METEOROID DUST CLOUDS
RT % CLOUDS
    ....ZODIACAL DUST
    EXPLORER SATELLITES
    TERRESTRIAL DUST BELT

METEOROID HAZARDS
  3005 3009 3110 3201
  UF    METEOR HAZARDS
  GS    HAZARDS
        .FLIGHT HAZARDS
        .#METEOROID HAZARDS
RT    METEORITE COLLISIONS
      METEORITIC DAMAGE
      METEORIDS
      OPERATIONAL HAZARDS
      PROJECTILE CRATERING
      SPACECRAFT BREAKUP

METEOROID PROTECTION
  0508 3005 3110 3201 3203
  GS    PROTECTION
        #METEOROID PROTECTION
RT    BUMPERS
      IMPACT DAMAGE
      METEORITIC DAMAGE
      SPACECRAFT SHIELDING
      SPACECRAFT STRUCTURES

```

```

METEOROID SHOWERS
  3005 3009 3110
  UF    METEOR BURSTS
  GS    CELESTIAL BODIES
        #METEOROID SHOWERS
        .AQUARID METEORIDS
        .ARIETID METEORIDS
        .CYRILLID METEORIDS
        .DRACONID METEORIDS
        .GEMINID METEORIDS
        .LEONID METEORIDS
        .ORIONID METEORIDS
        .PERSEID METEORIDS
        .QUADRANTID METEORIDS
        .TAURID METEORIDS
RT    ASTRONOMY
      BOLIDES
      COMETS
      METEOR TRAILS
      METEORITES
      METEORIDS
      % SHOWERS

METEOROID TECHNOLOGY SATELLITE
  USE EXPLORER 46 SATELLITE

METEORIDS
  3001 3005 3009
  SN    (LIMITED TO SOLID OBJECTS IN
        SPACE, MUCH SMALLER THAN AN
        ASTEROID AND MUCH LARGER THAN A
        MOLECULE)
  UF    METEORS
  GS    CELESTIAL BODIES
        #METEORIDS
        .AQUARID METEORIDS
        .ARIETID METEORIDS
        .BOLIDES
        .CYRILLID METEORIDS
        .DRACONID METEORIDS
        .GEMINID METEORIDS
        .LEONID METEORIDS
        .MICROMETEORIDS
        ....METEOROID DUST CLOUDS
        ....ZODIACAL DUST
        .ORIONID METEORIDS
        .PERSEID METEORIDS
        .QUADRANTID METEORIDS
        .RADIO METEORS
        .SPORADIC METEORIDS
        .TAURID METEORIDS
RT    ASTEROID BELTS
      ASTEROIDS
      BUMPERS
      CHIRON

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COMETS  
COSMIC DUST  
HYPERVELOCITY PROJECTILES  
INTERPLANETARY DUST  
INTERPLANETARY MEDIUM  
METEOR TRAILS  
METEORITES  
METEOROID HAZARDS  
METEOROID SHOWERS  
MICROMETEORITES  
NATURAL SATELLITES  
PARTICLE TRACKS  
RADIATION METEOROID SPACECRAFT  
SOLAR SYSTEM  
SPACE DEBRIS  
TEMPEL 2 COMET  
TORO ASTEROID  
VESTA ASTEROID

METEOROLOGICAL BALLOONS  
O205 2002 2003 3202  
GS EXPANDABLE STRUCTURES  
. INFLATABLE STRUCTURES  
..BALLOONS  
...#METEOROLOGICAL BALLOONS  
....JIMSPHERE BALLOONS  
.....ROBIN BALLOONS  
.....DROPSONDES  
HIGH ALTITUDE BALLOONS  
RADIOSONDES  
RAWINSONDES  
ROCKOONS  
SKYHOOK BALLOONS  
SOUNDING  
SUPERPRESSURE BALLOONS  
TETHERED BALLOONS  
UPPER ATMOSPHERE  
WEATHER FORECASTING

METEOROLOGICAL CHARTS  
2003  
UF WEATHER CHARTS  
WEATHER MAPS  
GS CHARTS  
#METEOROLOGICAL CHARTS  
MAPS  
#METEOROLOGICAL CHARTS  
RT ISOBARS (PRESSURE)  
RADAR MAPS  
SYNOPTIC METEOROLOGY

METEOROLOGICAL FLIGHT  
2003 2004  
RT AERIAL RECONNAISSANCE  
BALLOON FLIGHT

% FLIGHT  
ICE REPORTING  
ROCKET FLIGHT  
SIRS B SATELLITE  
SOUNDING  
SPACE FLIGHT  
WEATHER FORECASTING

METEOROLOGICAL INSTRUMENTS  
2002 2003 2004  
GS MEASURING INSTRUMENTS  
#METEOROLOGICAL INSTRUMENTS  
..BAROMETERS  
..CLOUD HEIGHT INDICATORS  
..DROPSONDES  
..RADIO METEOROLOGICALS  
..RADIOSONDES  
...ENDORADIOSONDES  
...IONOSONDES  
...RAWINSONDES  
..RAIN GAGES  
..WEATHER DATA RECORDERS  
..WIND VANES  
ANEMOMETERS  
BALLOON-BORNE INSTRUMENTS  
HOT-FILM ANEMOMETERS  
HOT-WIRE ANEMOMETERS  
HUMIDITY MEASUREMENT  
HYGROMETERS  
HYPSONOMETERS  
% INSTRUMENTS  
LIGHT SCATTERING METERS  
METEOROLOGY  
NEPHANALYSIS  
PSYCHROMETERS  
RECORDING INSTRUMENTS  
ROCKET-BORNE INSTRUMENTS  
SIRS B SATELLITE  
SODAR  
SOUND DETECTING AND RANGING  
SOUNDING ROCKETS  
TRANSDUCERS  
WEATHER RECONNAISSANCE AIRCRAFT  
WEATHER STATIONS

METEOROLOGICAL PARAMETERS  
1902 2003 2308 2403  
GS CONSTRAINTS  
#METEOROLOGICAL PARAMETERS  
..BRUNT-VAISALA FREQUENCY  
RT AEROLGY  
AGROCLIMATOLOGY  
ANNUAL VARIATIONS  
ATMOSPHERIC & OCEANOGRAPHIC INFORM  
SYS

METEOROLOGICAL PROBES  
USE SONDES  
METEOROLOGICAL RADAR  
2002 2003  
UF WEATHER RADAR  
GS RADAR  
RT #METEOROLOGICAL RADAR  
PRECIPITATION PARTICLE MEASUREMENT  
PULSE RADAR  
RADAR SCANNING  
RADAR TRACKING  
RADIO METEOROLOGY  
SURVEILLANCE RADAR  
WEATHER FORECASTING

METEOROLOGICAL RESEARCH AIRCRAFT  
O201  
RT % AIRCRAFT  
DATA ACQUISITION  
RESEARCH AIRCRAFT

METEOROLOGICAL ROCKETS  
USE SOUNDING ROCKETS  
METEOROLOGICAL SATELLITES  
2003 2004 3107  
GS ARTIFICIAL SATELLITES  
#METEOROLOGICAL SATELLITES  
..AEROS SATELLITE  
..COSMOS 144 SATELLITE

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..D-2 SATELLITES
..DMSP SATELLITES
..ELEKRON SATELLITES
...ELEKRON 1 SATELLITE
...ELEKRON 2 SATELLITE
...ELEKRON 4 SATELLITE
...EOLE SATELLITES
...ESSA SATELLITES
...ESSA 1 SATELLITE
...ESSA 2 SATELLITE
...ESSA 3 SATELLITE
...ESSA 4 SATELLITE
...ESSA 5 SATELLITE
...ESSA 6 SATELLITE
...ESSA 7 SATELLITE
...ESSA 8 SATELLITE
...ESSA 9 SATELLITE
...EXPLORER 9 SATELLITE
...EXPLORER 17 SATELLITE
...EXPLORER 19 SATELLITE
...GEOLE SATELLITES
...GOES 6
...METEOSAT SATELLITE
...NIMBUS SATELLITES
...NIMBUS 1 SATELLITE
...NIMBUS 2 SATELLITE
...NIMBUS 3 SATELLITE
...NIMBUS 4 SATELLITE
...NIMBUS 5 SATELLITE
...NIMBUS 6 SATELLITE
...NIMBUS 7 SATELLITE
...NOAA SATELLITES
...NOAA 2 SATELLITE
...NOAA 3 SATELLITE
...NOAA 4 SATELLITE
...NOAA 5 SATELLITE
...NOAA 6 SATELLITE
...NOAA 7 SATELLITE
...NOAA 8 SATELLITE
...NOAA 9 SATELLITE
...NOAA 10 SATELLITE
...SAN MARCO SATELLITES
...SAN MARCO 1 SATELLITE
...SAN MARCO 2 SATELLITE
...SAN MARCO 3 SATELLITE
...SEDCS (SATELLITE)
...SIRS B SATELLITE
...SPUTNIK 1 SATELLITE
...SPUTNIK 2 SATELLITE
...SPUTNIK 3 SATELLITE
...SRET SATELLITES
...SRET 1 SATELLITE
...SRET 2 SATELLITE
...SYNCHRONOUS EARTH OBS
...SATELLITE

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...SMS 1
...SMS 2
..SYNCHRONOUS METEOROLOGICAL
  SATELLITE
...SMS 1
...SMS 2
...TIROS SATELLITES
...ITOS SATELLITES
...ITOS 1
...ITOS 2
...ITOS 3
...ITOS 4
...TIROS M
...TIROS N SERIES SATELLITES
...TIROS 1 SATELLITE
...TIROS 2 SATELLITE
...TIROS 3 SATELLITE
...TIROS 4 SATELLITE
...TIROS 5 SATELLITE
...TIROS 6 SATELLITE
...TIROS 7 SATELLITE
...TIROS 8 SATELLITE
...TIROS 9 SATELLITE
...TIROS 10 SATELLITE
...VANGUARD 2 SATELLITE
AGRICULTURE PROJECT
RT
ATS
CLOUD PHOTOGRAPHY
GEOPHYSICAL SATELLITES
GOES SATELLITES
GOES 1
GOES 2
GOES 3
GOES 4
GOES 5
INFRARED PHOTOGRAPHY
JAPANESE SPACE PROGRAM
METEOROLOGY
MILITARY SPACECRAFT
NAVIGATION SATELLITES
NIMBUS PROJECT
NOECS
SATELLITE OBSERVATION
SATELLITE SOUNDING
SATELLITE TELEVISION
SOUNDING ROCKETS
SPACE PROBES
TIROS PROJECT
UNMANNED SPACECRAFT
VANGUARD SATELLITES
WEATHER FORECASTING
WEATHER STATIONS

METEOROLOGICAL SERVICES
2001 2003

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GS SERVICES
RT #METEOROLOGICAL SERVICES
AUTOMATIC WEATHER STATIONS
FLIGHT CONDITIONS
WEATHER FORECASTING
WEATHER STATIONS

METEOROLOGICAL SOLENOIDS
2002
RT BAROCLINITY
VORTICES

METEOROLOGICAL STATIONS
USE WEATHER STATIONS

METEORLOGY
2003
UF ATMOSPHERIC CONDITIONS
GS #METEORLOGY
.AEROLGY
.AGROMETEORLOGY
.ALPINE METEORLOGY
.AVIATION METEORLOGY
.BIOMETEORLOGY
.HYDROMETEORLOGY
..MARINE METEORLOGY
.MESOMETEORLOGY
..MICROBURSTS (METEORLOGY)
.NUCLEAR METEORLOGY
.PLANETARY METEORLOGY
.POLAR METEORLOGY
.RADIO METEORLOGY
.SYNOPTIC METEORLOGY
.TROPICAL METEORLOGY
.WEATHER FORECASTING
..LONG RANGE WEATHER FORECASTING
..NOWCASTING
..NUMERICAL WEATHER FORECASTING
..STATISTICAL WEATHER FORECASTING

RT ACID RAIN
ACOUSTIC SOUNDING
AERONOMY
AGROCLIMATOLOGY
AIR LAND INTERACTIONS
AIR MASSES
ANNUAL VARIATIONS
ANTICYCLONES
ANVIL CLOUDS
ARC CLOUDS
% ATMOSPHERES
ATMOSPHERIC & OCEANOGRAPHIC INFORM
SYS
ATMOSPHERIC DENSITY

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[illegible]

[illegible]

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

## VERMICULITE

MICARTA  
1504 1805 1808 1811 3202  
GS COMPOSITE MATERIALS  
.POLYMER MATRIX COMPOSITES  
.REINFORCED PLASTICS  
..#MICARTA

PLASTICS  
.REINFORCED PLASTICS  
..#MICARTA  
.SYNTHETIC RESINS  
..THERMOSETTING RESINS  
...PHENOLIC RESINS  
...#MICARTA

RESINS  
.SYNTHETIC RESINS  
..THERMOSETTING RESINS  
...PHENOLIC RESINS  
...#MICARTA  
FABRICS  
FIBER COMPOSITES  
INSULATION  
% POLYMERS

MICE  
O402  
GS ANIMALS  
.VERTEBRATES  
..MAMMALS  
...RODENTS  
...#MICE  
.....JERBOAS  
.....POCKET MICE  
RT RATS

MICHAEL REACTION  
O602 1808  
GS CHEMICAL REACTIONS  
#MICHAEL REACTION

MICHAELIS THEORY  
O603 1808  
RT % THEORIES

MICHELL THEOREM  
2308 3203  
GS THEOREMS  
#MICHELL THEOREM  
RT STRESS ANALYSIS  
STRUCTURAL ANALYSIS

MICHELSON INTERFEROMETERS  
1405 2306 2310 2903  
GS MEASURING INSTRUMENTS

.INTERFEROMETERS  
..MICHELSON INTERFEROMETERS  
RT ASTROPHYSICS  
RADIO ASTRONOMY  
SPECTROMETERS

MICHIGAN  
1305  
GS NATIONS  
.UNITED STATES  
..#MICHIGAN  
RT PONTIAC (MI)  
SAGINAW BAY (MI)

MICROANALYSIS  
O601 O602 1002 2202  
GS CHEMICAL TESTS  
.CHEMICAL ANALYSIS  
..#MICROANALYSIS  
RT ELECTRON MICROSCOPES  
ELECTRON MICROSCOPY  
ELECTROPHOTOMETRY  
MASS SPECTROMETERS  
% MATERIALS TESTS  
NEUTRON ACTIVATION ANALYSIS  
QUALITATIVE ANALYSIS  
QUANTITATIVE ANALYSIS  
SCANNING ELECTRON MICROSCOPY  
SPECTROSCOPIC ANALYSIS  
TRANSMISSION ELECTRON MICROSCOPY  
X RAY ANALYSIS

MICROBALANCES  
O905 1406 3501  
UF MICROSCALES  
GS MEASURING INSTRUMENTS  
.INDICATING INSTRUMENTS  
..WEIGHT INDICATORS  
...#MICROBALANCES

MICROBALLOONS  
O205 3202  
GS EXPANDABLE STRUCTURES  
.INFLATABLE STRUCTURES  
..BALLOONS  
...#MICROBALLOONS  
RT GLOBULES  
LASERS  
SPHERES  
TARGETS

MICROBE  
USE MICROORGANISMS  
MICROBEAMS

1002 2304 2403  
GS BEAMS (RADIATION)  
#MICROBEAMS  
RT COLLIMATION  
CRYSTALLOGRAPHY  
X RAY ANALYSIS

MICROBIOLOGY  
O404 O407  
GS #MICROBIOLOGY  
.BACTERIOLOGY  
RT % BIOLOGY  
CULTURE TECHNIQUES  
GNOTOBIOTICS

MICROBURSTS (METEOROLOGY)  
2001 2003  
SN (EXCLUDES IONOSPHERIC RADIATION  
MICROBURSTS) URSTS)  
GS METEOROLOGY  
.MICROMETEOROLOGY  
..#MICROBURSTS (METEOROLOGY)  
STORMS  
.STORMS (METEOROLOGY)  
..DOWNBURSTS  
...#MICROBURSTS (METEOROLOGY)  
RT AVIATION METEOROLOGY  
FLIGHT HAZARDS  
THUNDERSTORMS  
VERTICAL AIR CURRENTS  
WIND SHEAR

MICROCALORIMETERS  
USE CALORIMETERS  
MICROCHANNEL PLATES  
O703  
UF MULTICHANNEL PLATES  
RT CHANNEL MULTIPLIERS  
DYNAMIC RANGE  
INTEGRATED CIRCUITS  
MICROCHANNELS  
MICROWAVE EQUIPMENT  
PHOTOMULTIPLIER TUBES  
% PLATES  
THIN FILMS

MICROCHANNELS  
1413 2306 3501  
RT FREQUENCIES  
IMAGE CONVERTERS  
LIGHT AMPLIFIERS  
MICROCHANNEL PLATES  
MULTI-ANODE MICROCHANNEL ARRAYS  
NIGHT VISION

OPTICAL EQUIPMENT  
PHOTOCATHODES  
ULTRAVIOLET RADIATION

**MICROCIRCUITS  
USE MICROELECTRONICS**

MICROCLIMATOLOGY  
2001 2003  
GS CLIMATOLOGY  
RT #MICROCLIMATOLOGY  
AGROCLIMATOLOGY  
BIOMETEOROLOGY  
MICROMETEOROLOGY

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MICROCOMPUTERS
O802
GS DATA PROCESSING EQUIPMENT
.COMPUTERS
..DIGITAL COMPUTERS
..#MICROCOMPUTERS
....PERSONAL COMPUTERS
....IBM PERSONAL COMPUTERS
....MACINTOSH PERSONAL COMPUTERS
RT MICROPROCESSORS
MINICOMPUTERS

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MICROCRACKS
0602 3404
GS FRACTURES (MATERIALS)
. CRACKS
. #MICROCRACKS
RT CRACK CLOSURE
CRACK GEOMETRY
CRACK INITIATION
ELBER EQUATION
SURFACE CRACKS

```

MICROCRYSTALS  
1002 2601  
GS CRYSTALS  
#MICROCRYSTALS  
RT CRYSTALLITES  
SPHERULITES

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MICROCYSTIS
0404 0407 0409 0412
GS  PLANTS (BOTANY)
    .ALGAE
    ..BLUE GREEN ALGAE
    ...#MICROCYSTIS
RT  POLLUTION

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MICRODENSITOMETERS  
1411 2306 2310 2402 3009

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GS      MEASURING INSTRUMENTS
        . DENSITOMETERS
        . #MICRODENSITOMETERS
        . OPTICAL MEASURING INSTRUMENTS
        . #MICRODENSITOMETERS
        . OPTICAL EQUIPMENT
        . OPTICAL MEASURING INSTRUMENTS
        . #MICRODENSITOMETERS
RT      GRAVIMETERS
        . OPTICAL DENSITY
        . OPTICAL MEASUREMENT
        . PHOTOMETERS

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MICROELECTRONICS
1001 1002
UF MICROCIRCUITS
GS #MICROELECTRONICS
.LARGE SCALE INTEGRATION
.MEDIUM SCALE INTEGRATION
.VERY LARGE SCALE INTEGRATION
RT BEAM LEADS
CIRCUITS
% ELECTRONICS
ENCAPSULATED MICROCIRCUITS
ION IMPLANTATION
LASER MICROSCOPY
MICROINSTRUMENTATION
MICROMINIATURIZATION
MICROMINIATURIZED ELECTRONIC
DEVICES

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**MICROMODULES  
MOLECULAR ELECTRONICS  
PHOTOLITHOGRAPHY  
PHOTOMASKS  
SINGLE EVENT UPSETS  
TRANSISTOR CIRCUITS  
WAFERS**

| MICROFIBERS | FIBERS | #MICROFIBERS |
|-------------|--------|--------------|
| 1811        |        |              |
| GS          |        |              |

MICROFILMS  
1407 3401 3405 9001  
GS PHOTOGRAPHIC FILM  
#MICROFILMS  
RT DATA RETRIEVAL  
DATA STORAGE  
MICROPHOTOGRAPHS  
READERS  
REPRODUCTION (COPYING)

**MICROGRAPHY**  
**USE PHOTOMICROGRAPHY**

MICROGRAVITY  
1309  
UF LOW GRAVITY  
REDUCED GRAVITY  
SUBGRAVITY  
GS GRAVITATION  
#MICROGRAVITY  
RT ANTIGRAVITY  
BIOPROCESSING  
DROP TOWERS  
FLUID MANAGEMENT  
HIGH GRAVITY ENVIRONMENTS  
LOW GRAVITY MANUFACTURING  
LOW WEIGHT  
MARANGONI CONVECTION

% MICROGRAVITY APPLICATIONS  
1309  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT BIOPROCESSING  
COMMERCE LAB  
CRYSTAL GROWTH  
ELECTROPHORESIS  
LOW GRAVITY MANUFACTURING  
SPACE COMMERCIALIZATION  
SPACE MANUFACTURING  
SPACE PROCESSING

MICROHARDNESS  
O407 1704 3203 3408  
UF MICROINDENTATION  
GS MECHANICAL PROPERTIES  
HARDNESS  
RT .#MICROHARDNESS  
KNOOP HARDNESS  
ROCKWELL HARDNESS

**MICROINDENTATION  
USE MICROHARDNESS**

**MICROINSTRUMENTATION**  
O501 1402 1406 1410 3501  
RT MEASURING INSTRUMENTS  
MICROELECTRONICS  
MICROMINIATURIZATION

MICROMACHINING  
1504  
GS MACHINING  
RT CUTTING  
#MICROMACHINING  
DRILLING

# NASA THESAURUS HIERARCHICAL UPDATE

GRINDING (MATERIAL REMOVAL)  
 GROOVING  
 LASER CUTTING  
 LASER DRILLING  
 METAL CUTTING  
 METAL WORKING  
 MICROMECHANICS  
 MICROSTRUCTURE  
 PHOTOENGRAVING  
 PHOTOMASKS  
 PHOTOMECHANICAL EFFECT  
 SURFACE FINISHING  
 V GROOVES

MICROMANOMETERS  
 USE MANOMETERS

MICROMECHANICS

O802  
 RT COMPOSITE MATERIALS  
 CRACK PROPAGATION  
 FRACTURE MECHANICS  
 MECHANICAL PROPERTIES  
 % MECHANICS (PHYSICS)  
 MICROMACHINING  
 MICROSTRUCTURE  
 REINFORCING FIBERS  
 STRESS CONCENTRATION

MICROMETEORITES

3005 3009  
 GS CELESTIAL BODIES  
 .METEORITES  
 .#MICROMETEORITES  
 RT COSMIC DUST  
 HYPERVELOCITY PROJECTILES  
 METEORIDS  
 MICROMETEORIDS  
 TEKTITES  
 ZODIACAL DUST

MICROMETEOROID EXPLORER SATELLITES

3107  
 GS ARTIFICIAL SATELLITES  
 .SCIENTIFIC SATELLITES  
 ..EXPLORER SATELLITES  
 ..#MICROMETEOROID EXPLORER  
 SATELLITES

MICROMETEORIDS

3005  
 UF METEORITIC DUST  
 MICROMETEORS  
 GS CELESTIAL BODIES  
 .METEORIDS

.#MICROMETEORIDS  
 ...METEOROID DUST CLOUDS  
 ....ZODIACAL DUST  
 COSMIC DUST  
 EXPLORER SATELLITES  
 INTERPLANETARY DUST  
 METEOR TRAILS  
 METEORITES  
 MICROMETEORITES  
 POYNTING-ROBERTSON EFFECT  
 SPACE DEBRIS  
 TERRESTRIAL DUST BELT  
 ZODIACAL LIGHT

MICROMETEOROLOGY

2001 2002  
 GS METEOROLOGY  
 #MICROMETEOROLOGY  
 .-MICROBURSTS (METEOROLOGY)  
 RT AGROMETEOROLOGY  
 MESOMETEOROLOGY  
 MICROCLIMATOLOGY  
 TURBULENCE

MICROMETEORS

USE MICROMETEORIDS

MICROMETERS

1406  
 GS MEASURING INSTRUMENTS  
 #MICROMETERS  
 RT DIMENSIONAL MEASUREMENT  
 DISTANCE MEASURING EQUIPMENT

MICROMILLIAMMETERS

1406  
 GS MEASURING INSTRUMENTS  
 .AMMETERS  
 .#MICROMILLIAMMETERS  
 RT ELECTRIC CURRENT  
 ELECTRICAL MEASUREMENT  
 GALVANOMETERS

MICROMINIATURIZATION

1001 1002  
 GS MINIATURIZATION  
 #MICROMINIATURIZATION  
 RT CIRCUITS  
 DTL INTEGRATED CIRCUITS  
 INTEGRATED CIRCUITS  
 LARGE SCALE INTEGRATION  
 LINEAR INTEGRATED CIRCUITS  
 MICROELECTRONICS  
 MICROINSTRUMENTATION  
 MICROMINIATURIZED ELECTRONIC

DEVICES  
 MINIATURE ELECTRONIC EQUIPMENT  
 MOLECULAR ELECTRONICS  
 SEMICONDUCTOR DEVICES  
 SUBMINIATURIZATION  
 THICK FILMS  
 THIN FILMS  
 TTL INTEGRATED CIRCUITS  
 WAFERS

MICROMINIATURIZED ELECTRONIC DEVICES

O905 1002  
 GS #MICROMINIATURIZED ELECTRONIC  
 DEVICES

RT MICROMODULES  
 MICROELECTRONICS  
 MICROMINIATURIZATION  
 MINIATURE ELECTRONIC EQUIPMENT

MICROMODULES

1002  
 GS ELECTRONIC EQUIPMENT  
 .ELECTRONIC MODULES  
 .#MICROMODULES  
 MICROMINIATURIZED ELECTRONIC  
 DEVICES  
 #MICROMODULES  
 MODULES

.ELECTRONIC MODULES  
 .#MICROMODULES

RT BEAM LEADS  
 % CONTAINERS  
 ELECTRONIC PACKAGING  
 MICROELECTRONICS  
 MICROPROCESSORS  
 MINIATURE ELECTRONIC EQUIPMENT  
 PHOTOLITHOGRAPHY

MICROMOTORS

O904 1002  
 SN (EXCLUDES ROCKET ENGINES)  
 GS MOTORS  
 .ELECTRIC MOTORS  
 .#MICROMOTORS

MICROORGANISMS

O402 O407  
 UF MICROBE  
 GS #MICROORGANISMS  
 .BACTERIA  
 ..ACTINOMYCETES  
 ..ARCHAEBACTERIA  
 ..AZOTOBACTER  
 ..BACILLUS  
 ...STEARTHERMOPHILUS

..CLOSTRIDIUM  
 ..CLOSTRIDIUM BOTULINUM  
 ..ESCHERICHIA  
 ..HYDROGENOMONAS  
 ..KLEBSIELLA  
 ..NITROBACTER  
 ..PSEUDOMONAS  
 ..SALMONELLA  
 ..SARCINA  
 ..SERRATIA  
 ..STAPHYLOCOCCUS  
 ..STREPTOCOCCUS  
 ..STREPTOMYCETES  
 ..PROTOZOA  
 ..AMOEBA  
 ...PELOMYXA  
 ..FLAGELLATA  
 ...EUGLENA  
 ...TRYPANOSOME  
 ..PARAMECIA  
 ..ROTIFERA  
 ..VIRUSES  
 ..ADENOVIRUSES  
 ..BACTERIOPHAGES  
 ..HUMAN IMMUNODEFICIENCY VIRUS  
 AEROBES  
 ALGAE  
 ANAEROBES  
 ANIMALS  
 ANTIBIOTICS  
 GNOTOBIOLOGICS  
 INVERTEBRATES  
 MESOPHILES  
 MICROPARTICLES  
 MICROSPORES  
 PLANTS (BOTANY)  
 POLLUTION  
 PSYCHROPHILES  
 RED TIDE  
 SAPROPHYTES  
 SPORES  
 VIRULENCE  
 MICROPARTICLES  
 2403  
 GS  
 #MICROPARTICLES  
 RT  
 CONDENSATION NUCLEI  
 FERROFLUIDS  
 MICROORGANISMS  
 PARTICULATE REINFORCED COMPOSITES  
 MICROPHONES  
 0905 1413 2301 3501  
 GS  
 AUDIO EQUIPMENT

#MICROPHONES  
 TRANSDUCERS  
 .SOUND TRANSDUCERS  
 ..ELECTROACOUSTIC TRANSDUCERS  
 ..#MICROPHONES  
 HYDROPHONES  
 INTERPHONES  
 MAGNETIC TRANSDUCERS  
 MONAURAL SIGNALS  
 TRANSMITTERS  
 ULTRASONIC WAVE TRANSDUCERS  
 MICROPHOTOGRAPHS  
 1407 1412  
 GS  
 PHOTOGRAPHS  
 #MICROPHOTOGRAPHS  
 RT  
 DATA STORAGE  
 MICROFILMS  
 PHOTOGRAPHY  
 PHOTOMASKS  
 MICROPHOTOMETERS  
 USE PHOTOMETERS  
 MICROPLASMAS  
 2501 2502  
 GS  
 PARTICLES  
 .CHARGED PARTICLES  
 ..ENERGETIC PARTICLES  
 ...PLASMAS (PHYSICS)  
 ...#MICROPLASMAS  
 MICROPOLAR FLUIDS  
 0407 1202 0603  
 GS  
 INCOMPRESSIBLE FLUIDS  
 #MICROPOLAR FLUIDS  
 RT  
 FLUID MECHANICS  
 % FLUIDS  
 MICROSTRUCTURE  
 MICROPOROSITY  
 1704 2601 3408  
 GS  
 POROSITY  
 #MICROPOROSITY  
 RT  
 MECHANICAL PROPERTIES  
 METALLOGRAPHY  
 MICROSTRUCTURE  
 MICROPROCESSORS  
 0801  
 GS  
 DATA PROCESSING EQUIPMENT  
 #MICROPROCESSORS  
 ..INTEL 8080 MICROPROCESSOR  
 RT  
 CENTRAL PROCESSING UNITS  
 COMPUTER DESIGN

COMPUTER STORAGE DEVICES  
 COMPUTER TECHNIQUES  
 DATA PROCESSING  
 DISTRIBUTED PROCESSING  
 FIRMWARE  
 INTEGRATED CIRCUITS  
 LARGE SCALE INTEGRATION  
 MICROCOMPUTERS  
 MICROMODULES  
 ONBOARD DATA PROCESSING  
 TRANSPUTERS  
 MICROPROGRAMMING  
 0802  
 GS  
 COMPUTER PROGRAMMING  
 #MICROPROGRAMMING  
 RT  
 FIRMWARE  
 % PROGRAMMING  
 MICROPULSATIONS  
 1307 2307 2402  
 GS  
 PULSES  
 #MICROPULSATIONS  
 ..GEOMAGNETIC MICROPULSATIONS  
 RT  
 VARIATIONS  
 MICROROCKET ENGINES  
 3106  
 GS  
 ENGINES  
 .ROCKET ENGINES  
 .#MICROROCKET ENGINES  
 ...ORBIT MANEUVERING ENGINE (SPACE SHUTTLE)  
 RT  
 ELECTRIC ROCKET ENGINES  
 ELECTROSTATIC ENGINES  
 MICROTHRUST  
 VERNIER ENGINES  
 MICROSCALES  
 USE MICROBALANCES  
 MICROSCOPES  
 1106 2310  
 GS  
 #MICROSCOPES  
 .ACOUSTIC MICROSCOPES  
 .ELECTRON MICROSCOPES  
 .ION MICROSCOPES  
 .OPTICAL MICROSCOPES  
 RT  
 BINOCULARS  
 EYEPIECES  
 METALLOGRAPHY  
 MICROSCOPY  
 OPTICAL EQUIPMENT  
 OPTICAL MEASURING INSTRUMENTS  
 PHOTOMICROGRAPHY

|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|---------------------|--|------------------------------------|----|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MICROSCOPY          |  | ULTRAVIOLET MICROSCOPY             | RT | ANTENNA DESIGN<br>MICROSTRIP TRANSMISSION LINES<br>MICROWAVE ANTENNAS<br>WAVEGUIDE ANTENNAS | MICROPOROSITY<br>MOLECULAR DYNAMICS<br>ORDER-DISORDER TRANSFORMATIONS<br>PEARLITE<br>PHOTOMICROGRAPHY<br>PRECIPITATES<br>QUENCHING (COOLING)<br>SHAPE MEMORY ALLOYS<br>SILICON ALLOYS<br>SPHERULITES<br>% STRUCTURES<br>THERMOMECHANICAL TREATMENT<br>VANADIUM ALLOYS<br>WORK SOFTENING |
| 0501 1406 2310      |  | .ATOMIC FORCE MICROSCOPY           |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| GS #MICROSCOPY      |  | .ELECTRON MICROSCOPY               |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | ..SCANNING ELECTRON MICROSCOPY     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | ..SCANNING TUNNELING MICROSCOPY    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | ..TRANSMISSION ELECTRON MICROSCOPY |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | .LASER MICROSCOPY                  |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | .PHOTOACOUSTIC MICROSCOPY          |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | .ULTRAVIOLET MICROSCOPY            |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| RT                  |  | CYTOMETRY                          |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROSCOPES                        |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROTOMY                          |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | PHASE CONTRAST                     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | PHOTOMICROGRAPHY                   |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | SLIDES (MICROSCOPY)                |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| MICROSEISMS         |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| 1308                |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| GS                  |  | ELASTIC WAVES                      |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | .SEISMIC WAVES                     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | .#MICROSEISMS                      |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| RT                  |  | CRUSTAL FRACTURES                  |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | EARTHQUAKE DAMAGE                  |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | EARTHQUAKES                        |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| MICROSTRUCTURE      |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| 0407 1704 2601      |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| GS #MICROSTRUCTURE  |  | .METEORITIC MICROSTRUCTURES        |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | .WIDMANSTATTEN STRUCTURE           |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | AGING (MATERIALS)                  |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | AGING (METALLURGY)                 |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | ATOMIC FORCE MICROSCOPY            |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | AUSTENITE                          |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | BAINITE                            |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | BAUSCHINGER EFFECT                 |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | CAST ALLOYS                        |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | CASTING                            |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | CASTINGS                           |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | CEMENTITE                          |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | CRYSTAL STRUCTURE                  |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | CRYSTALLOGRAPHY                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | FERRITES                           |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | GRAIN SIZE                         |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | HARDENING (MATERIALS)              |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | HEAT TREATMENT                     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | LAMELLA (METALLURGY)               |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MARTENSITE                         |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | METALLOGRAPHY                      |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROMACHINING                     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROMECHANICS                     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROPOLAR FLUIDS                  |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| MICROSPORES         |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| 0404 0409           |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| GS                  |  | SPORES                             |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | #MICROSPORES                       |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| RT                  |  | FUNGI                              |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROORGANISMS                     |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | PLANTS (BOTANY)                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | PROTOZOA                           |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| MICROSTRIP ANTENNAS |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| 0701 0901           |  |                                    |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
| GS                  |  | ANTENNAS                           |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | #MICROSTRIP ANTENNAS               |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | MICROSTRIP DEVICES                 |    |                                                                                             |                                                                                                                                                                                                                                                                                         |
|                     |  | #MICROSTRIP ANTENNAS               |    |                                                                                             |                                                                                                                                                                                                                                                                                         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>           ABSORPTIVITY<br/>           ACTIVATION<br/>           ATMOSPHERIC ATTENUATION<br/>           MICROWAVE ATTENUATION<br/>           MICROWAVE FREQUENCIES<br/>           MICROWAVE SCATTERING<br/>           MICROWAVE TRANSMISSION<br/>           MICROWAVES<br/>           RADAR<br/>           RADAR ABSORBERS         </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>           MISSILE ANTENNAS<br/>           MULTIBEAM ANTENNAS<br/>           OMNIDIRECTIONAL ANTENNAS<br/>           PARABOLIC ANTENNAS<br/>           PARABOLIC REFLECTORS<br/>           RADAR ANTENNAS<br/>           REFLECTOR ANTENNAS<br/>           SLOT ANTENNAS<br/>           WAVEGUIDE ANTENNAS         </p>                                                                                                                                                                                             | <p>           LINEAR POLARIZATION<br/>           MICROWAVE SIGNATURES<br/>           STELLAR RADIATION         </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>           MICROWAVE AMPLIFIERS<br/>           0701 0705 0709<br/>           GS<br/>           AMPLIFIERS<br/>           #MICROWAVE AMPLIFIERS<br/>           ..CROSSED FIELD AMPLIFIERS<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..PLANOTRONS<br/>           MICROWAVE EQUIPMENT<br/>           #MICROWAVE AMPLIFIERS<br/>           ..CROSSED FIELD AMPLIFIERS<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..PLANOTRONS<br/>           MICROWAVE EQUIPMENT<br/>           0705 0905 2309<br/>           GS #MICROWAVE EQUIPMENT<br/>           .GYRATORS<br/>           ..MICROWAVE FILTERS<br/>           .MICROWAVE AMPLIFIERS<br/>           ..CROSSED FIELD AMPLIFIERS<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..PLANOTRONS<br/>           .MICROWAVE ANTENNAS<br/>           ..HORN ANTENNAS<br/>           ..LENS ANTENNAS<br/>           ..RECTENNAS<br/>           ..SPACETENNAS<br/>           .MICROWAVE INTERFEROMETERS<br/>           .MICROWAVE OSCILLATORS<br/>           ..MAGNETRONS<br/>           ..NIGOTRONS<br/>           .MICROWAVE PROBES<br/>           ..MICROWAVE PLASMA PROBES<br/>           .MICROWAVE RADIOMETERS<br/>           .MICROWAVE SCANNING BEAM LANDING<br/>           SYSTEM<br/>           .MICROWAVE TUBES<br/>           ..CELESCOPES<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..KLYSTRONS<br/>           ..MAGNETRONS<br/>           ..NIGOTRONS<br/>           ..PLANOTRONS<br/>           ..TRAVELING WAVE TUBES<br/>           ..BACKWARD WAVE TUBES<br/>           ....HELITRONS<br/>           ....CARCINOTRONS<br/>           .THYRATONS<br/>           GAS DISCHARGE TUBES<br/>           MICROCHANNEL PLATES<br/>           MICROSTRIP DEVICES         </p> | <p>           MICROWAVE ATTENUATION<br/>           0705 0904 2309 2402<br/>           GS<br/>           ATTENUATION<br/>           #MICROWAVE ATTENUATION<br/>           .TRANSMISSION<br/>           .ELECTROMAGNETIC WAVE TRANSMISSION<br/>           ..RADIO TRANSMISSION<br/>           ..#MICROWAVE ATTENUATION<br/>           .SIGNAL TRANSMISSION<br/>           ..RADIO TRANSMISSION<br/>           ..#MICROWAVE ATTENUATION<br/>           .MICROWAVE ABSORPTION<br/>           WAVE PROPAGATION         </p> | <p>           MICROWAVE EQUIPMENT<br/>           0705 0905 2309<br/>           GS #MICROWAVE EQUIPMENT<br/>           .GYRATORS<br/>           ..MICROWAVE FILTERS<br/>           .MICROWAVE AMPLIFIERS<br/>           ..CROSSED FIELD AMPLIFIERS<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..PLANOTRONS<br/>           .MICROWAVE ANTENNAS<br/>           ..HORN ANTENNAS<br/>           ..LENS ANTENNAS<br/>           ..RECTENNAS<br/>           ..SPACETENNAS<br/>           .MICROWAVE INTERFEROMETERS<br/>           .MICROWAVE OSCILLATORS<br/>           ..MAGNETRONS<br/>           ..NIGOTRONS<br/>           .MICROWAVE PROBES<br/>           ..MICROWAVE PLASMA PROBES<br/>           .MICROWAVE RADIOMETERS<br/>           .MICROWAVE SCANNING BEAM LANDING<br/>           SYSTEM<br/>           .MICROWAVE TUBES<br/>           ..CELESCOPES<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..KLYSTRONS<br/>           ..MAGNETRONS<br/>           ..NIGOTRONS<br/>           ..PLANOTRONS<br/>           ..TRAVELING WAVE TUBES<br/>           ..BACKWARD WAVE TUBES<br/>           ....HELITRONS<br/>           ....CARCINOTRONS<br/>           .THYRATONS<br/>           GAS DISCHARGE TUBES<br/>           MICROCHANNEL PLATES<br/>           MICROSTRIP DEVICES         </p> |
| <p>           MASERS<br/>           INTERSTELLAR MASERS<br/>           PARAMETRIC AMPLIFIERS<br/>           TRANSFERRED ELECTRON DEVICES         </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>           MICROWAVE CIRCUITS<br/>           0902 2309<br/>           GS<br/>           CIRCUITS<br/>           #MICROWAVE CIRCUITS<br/>           .MICROSTRIP DEVICES         </p>                                                                                                                                                                                                                                                                                                                                 | <p>           MICROWAVE TUBES<br/>           ..CELESCOPES<br/>           ..CYCLOTRON RESONANCE DEVICES<br/>           ..KLYSTRONS<br/>           ..MAGNETRONS<br/>           ..NIGOTRONS<br/>           ..PLANOTRONS<br/>           ..TRAVELING WAVE TUBES<br/>           ..BACKWARD WAVE TUBES<br/>           ....HELITRONS<br/>           ....CARCINOTRONS<br/>           .THYRATONS<br/>           GAS DISCHARGE TUBES<br/>           MICROCHANNEL PLATES<br/>           MICROSTRIP DEVICES         </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>           MICROWAVE ANTENNAS<br/>           0701 0901 2309<br/>           GS<br/>           ANTENNAS<br/>           .RADIO ANTENNAS<br/>           ..#MICROWAVE ANTENNAS<br/>           ...HORN ANTENNAS<br/>           ...LENS ANTENNAS<br/>           ...SPACETENNAS<br/>           MICROWAVE EQUIPMENT<br/>           #MICROWAVE ANTENNAS<br/>           ..HORN ANTENNAS<br/>           ..LENS ANTENNAS<br/>           ..RECTENNAS<br/>           ..SPACETENNAS<br/>           RADIO EQUIPMENT<br/>           .RADIO ANTENNAS<br/>           ..#MICROWAVE ANTENNAS<br/>           ...HORN ANTENNAS<br/>           ...LENS ANTENNAS<br/>           ...SPACETENNAS<br/>           AIRCRAFT ANTENNAS<br/>           ANTENNA ARRAYS<br/>           BACKFIRE ANTENNAS<br/>           DIRECTIONAL ANTENNAS<br/>           GREGORIAN ANTENNAS<br/>           HELICAL ANTENNAS<br/>           MICROSTRIP ANTENNAS         </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>           MICROWAVE EMISSION<br/>           1302 2309 2903<br/>           GS<br/>           ELECTROMAGNETIC RADIATION<br/>           .RADIO WAVES<br/>           ..SHORT WAVE RADIATION<br/>           ...MICROWAVES<br/>           ...#MICROWAVE EMISSION<br/>           EMISSION<br/>           #MICROWAVE EMISSION<br/>           COSMIC NOISE<br/>           DIFFRACTION RADIATION<br/>           EXTRATERRESTRIAL RADIATION<br/>           EXTRATERRESTRIAL RADIO WAVES         </p>                          | <p>           MICROWAVE FILTERS<br/>           0902 0904 2309<br/>           GS<br/>           ELECTROMAGNETIC WAVE FILTERS<br/>           .ELECTRIC FILTERS<br/>           ..#MICROWAVE FILTERS<br/>           MICROWAVE EQUIPMENT<br/>           .GYRATORS<br/>           ..#MICROWAVE FILTERS<br/>           BANDPASS FILTERS<br/>           BANDSTOP FILTERS<br/>           DIGITAL FILTERS<br/>           FIR FILTERS         </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

# NASA THESAURUS HIERARCHICAL UPDATE

HIGH PASS FILTERS  
 LOW PASS FILTERS  
 RADAR FILTERS  
 RADIO FILTERS  
 RECTANGULAR WAVEGUIDES  
 WAVEGUIDE FILTERS

## MICROWAVE FREQUENCIES

2309 2402  
 SN (1 TO 100 GHZ)  
 GS  
 FREQUENCIES  
 .RADIO FREQUENCIES  
 .#MICROWAVE FREQUENCIES  
 ...C BAND  
 ...EXTREMELY HIGH FREQUENCIES  
 ...P BAND  
 ...SUPERHIGH FREQUENCIES  
 ACOUSTIC MICROSCOPES  
 CENTIMETER WAVES  
 MICROWAVE ABSORPTION  
 MICROWAVES  
 PASSIVE L-BAND RADIOMETERS  
 PRAETERSONIC DEVICES

RT

## MICROWAVE HOLOGRAPHY

0705 1407 1601  
 GS  
 IMAGERY  
 .HOLOGRAPHY  
 .#MICROWAVE HOLOGRAPHY  
 PHOTOGRAPHY  
 .HOLOGRAPHY  
 .#MICROWAVE HOLOGRAPHY  
 IMAGING TECHNIQUES  
 MICROWAVES  
 WAVE FRONT RECONSTRUCTION

RT

## MICROWAVE IMAGERY

0705  
 GS  
 IMAGERY  
 .#MICROWAVE IMAGERY  
 RT  
 RADARSCOPES  
 SYNTHETIC APERTURE RADAR  
 X RAY IMAGERY

## MICROWAVE INTERFEROMETERS

1405 1406 2309  
 GS  
 MEASURING INSTRUMENTS  
 .INTERFEROMETERS  
 .#MICROWAVE INTERFEROMETERS  
 MICROWAVE EQUIPMENT  
 #MICROWAVE INTERFEROMETERS  
 RT  
 FABRY-PEROT INTERFEROMETERS  
 PLASMA DIAGNOSTICS

## MICROWAVE LANDING SYSTEMS

0203 0506 0507  
 GS  
 LANDING AIDS  
 #MICROWAVE LANDING SYSTEMS  
 .MICROWAVE SCANNING BEAM LANDING  
 SYSTEM  
 RT  
 AIR TRAFFIC CONTROL  
 AIRCRAFT LANDING  
 AIRCRAFT SAFETY  
 APPROACH CONTROL  
 AUTOMATED EN ROUTE ATC  
 AUTOMATIC LANDING CONTROL  
 % SYSTEMS

## MICROWAVE OSCILLATORS

0904 1201 2309  
 GS  
 MICROWAVE EQUIPMENT  
 #MICROWAVE OSCILLATORS  
 .MAGNETRONS  
 .NIGOTRONS  
 OSCILLATORS  
 #MICROWAVE OSCILLATORS  
 .MAGNETRONS  
 .NIGOTRONS  
 RT  
 BACKWARD WAVE TUBES  
 BARRITT DIODES  
 DIFFRACTION RADIATION  
 GAS DISCHARGE TUBES  
 KLYSTRONS  
 MICROWAVE TUBES  
 SUPERCONDUCTING CAVITY RESONATORS  
 TRANSFERRED ELECTRON DEVICES  
 TRAVELING WAVE TUBES  
 VACUUM TUBE OSCILLATORS  
 VOLTAGE CONTROLLED OSCILLATORS

RT

## MICROWAVE PHOTOGRAPHY

0705 0708 1407 1409 2003  
 GS  
 IMAGERY  
 .#MICROWAVE PHOTOGRAPHY  
 PHOTOGRAPHY  
 #MICROWAVE PHOTOGRAPHY  
 RT  
 RADAR DATA  
 RADAR PHOTOGRAPHY  
 RADARSCOPES

## MICROWAVE PLASMA PROBES

1406 2309 2502  
 GS  
 MEASURING INSTRUMENTS  
 .MICROWAVE PROBES  
 .#MICROWAVE PLASMA PROBES  
 MICROWAVE EQUIPMENT  
 .MICROWAVE PROBES  
 .#MICROWAVE PLASMA PROBES  
 ELECTRON PROBES  
 PLASMA FLUX MEASUREMENT  
 RT

PLASMA GUIDES  
 PLASMAS (PHYSICS)  
 RESONANCE PROBES

## MICROWAVE POWER BEAMING

3107 3109  
 UF  
 POWER TRANSMISSION (MICROWAVE)  
 GS  
 POWER BEAMING  
 #MICROWAVE POWER BEAMING  
 RT  
 LASER POWER BEAMING  
 MICROWAVE TRANSMISSION  
 SATELLITE POWER TRANSMISSION  
 SPACECRAFT POWER SUPPLIES

## MICROWAVE PROBES

1406 2309  
 GS  
 MEASURING INSTRUMENTS  
 #MICROWAVE PROBES  
 .MICROWAVE PLASMA PROBES  
 MICROWAVE EQUIPMENT  
 #MICROWAVE PROBES  
 .MICROWAVE PLASMA PROBES  
 RT  
 RADIO FREQUENCY IMPEDANCE PROBES

## MICROWAVE RADIATION

USE MICROWAVES

## MICROWAVE RADIOMETERS

1406 2309 2402  
 GS  
 MEASURING INSTRUMENTS  
 .RADIATION MEASURING INSTRUMENTS  
 .ACTINOMETERS  
 .RADIOMETERS  
 .#MICROWAVE RADIOMETERS  
 MICROWAVE EQUIPMENT  
 #MICROWAVE RADIOMETERS

## MICROWAVE REFLECTOMETERS

1406 2309  
 GS  
 MEASURING INSTRUMENTS  
 .OPTICAL MEASURING INSTRUMENTS  
 .REFLECTOMETERS  
 .#MICROWAVE REFLECTOMETERS  
 OPTICAL EQUIPMENT  
 .OPTICAL MEASURING INSTRUMENTS  
 .REFLECTOMETERS  
 .#MICROWAVE REFLECTOMETERS  
 RT  
 KINEMATICS

## MICROWAVE RESONANCE

0710 0902 2309 2402  
 GS  
 RESONANCE  
 #MICROWAVE RESONANCE  
 RT  
 CAVITY RESONATORS  
 HARMONIC ANALYSIS





# NASA THESAURUS HIERARCHICAL UPDATE

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.....CENTIMETER WAVES
.....DECIMETER WAVES
.....MICROWAVE EMISSION
.....MILLIMETER WAVES
RT COSMIC NOISE
DIFFRACTION RADIATION
ELECTROMAGNETIC NOISE
EXTRATERRESTRIAL RADIO WAVES
INFRARED RADIATION
MICROWAVE ABSORPTION
MICROWAVE FREQUENCIES
MICROWAVE HOLOGRAPHY
MICROWAVE SIGNATURES
MICROWAVE SOUNDING
% RADIATION
SATELLITE SOLAR ENERGY CONVERSION
SATELLITE SOLAR POWER STATIONS
SCATTEROMETERS
SUBMILLIMETER WAVES
WHISTLERS

MICROWEIGHING
USE WEIGHT MEASUREMENT

MICROYIELD STRENGTH
1704
GS MECHANICAL PROPERTIES
.YIELD STRENGTH
.#MICROYIELD STRENGTH
RT ELASTIC PROPERTIES
% STRENGTH
STRESSES
YIELD POINT

MICTURATION
USE URINATION

MID-OCEAN RIDGES
1305 1306 1310
UF MID-OCEANIC RIDGES
RT ATLANTIC OCEAN
GEOLOGICAL FAULTS
INDIAN OCEAN
OCEAN BOTTOM
OCEANOGRAPHY
PACIFIC OCEAN
% RIDGES
SEA FLOOR SPREADING
SEAMOUNTS
SEISMOLOGY

MID-OCEANIC RIDGES
USE MID-OCEAN RIDGES

MIDAIR COLLISIONS
MIDAS 3 SATELLITE
1404 3107
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
.#MIDAS 3 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
..MIDAS SATELLITES
..#MIDAS 3 SATELLITE

MIDAS 4 SATELLITE
1404 3107
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
.#MIDAS 4 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
..MIDAS SATELLITES
..#MIDAS 4 SATELLITE

MIDAS 5 SATELLITE
1404 3107
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
.#MIDAS 5 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
..MIDAS SATELLITES
..#MIDAS 5 SATELLITE

MIDAS 6 SATELLITE
1404 3107
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
.#MIDAS 6 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
..MIDAS SATELLITES
..#MIDAS 6 SATELLITE

MIDAS 7 SATELLITE
0705 3107
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
.#MIDAS 7 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
..MIDAS SATELLITES
..#MIDAS 7 SATELLITE

MIDCOURSE GUIDANCE
2102 2103
GS GUIDANCE (MOTION)
#MIDCOURSE GUIDANCE
RT COMMAND GUIDANCE

0203 2101
GS COLLISIONS
#MIDAIR COLLISIONS
..BIRD-AIRCRAFT COLLISIONS
RT AIR TRAFFIC CONTROL
AIRCRAFT ACCIDENTS
AIRCRAFT HAZARDS
AIRCRAFT SAFETY
BEACON COLLISION AVOIDANCE SYSTEM
COLLISION AVOIDANCE
CRASHES
FLIGHT HAZARDS
FLIGHT SAFETY
PILOT ERROR
THREAT EVALUATION

MIDALTITUDE
1308
GS ALTITUDE
#MIDALTITUDE
RT FLIGHT ALTITUDE
HIGH ALTITUDE
LOW ALTITUDE

MIDAS SATELLITES
1404 3107 3401
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
..MIDAS 2 SATELLITE
..MIDAS 3 SATELLITE
..MIDAS 4 SATELLITE
..MIDAS 5 SATELLITE
..MIDAS 6 SATELLITE
..MIDAS 7 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
.#MIDAS SATELLITES
...MIDAS 2 SATELLITE
...MIDAS 3 SATELLITE
...MIDAS 4 SATELLITE
...MIDAS 5 SATELLITE
...MIDAS 6 SATELLITE
...MIDAS 7 SATELLITE
RT ATLAS AGENA B LAUNCH VEHICLE

MIDAS 2 SATELLITE
1404 3107
GS ARTIFICIAL SATELLITES
.MIDAS SATELLITES
.#MIDAS 2 SATELLITE
MILITARY SPACECRAFT
.RECONNAISSANCE SPACECRAFT
..MIDAS SATELLITES
..#MIDAS 2 SATELLITE

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INERTIAL GUIDANCE
INJECTION GUIDANCE
RENDEZVOUS GUIDANCE
SPACECRAFT GUIDANCE
TERMINAL GUIDANCE
TRANSEARTH INJECTION
TRANSLUNAR INJECTION

MIDCOURSE TRAJECTORIES
1904 2102 2204 3101 3103 3105 3106
3108
GS
TRAJECTORIES
#MIDCOURSE TRAJECTORIES
RT
ASCENT TRAJECTORIES
BALLISTIC TRAJECTORIES
COASTING FLIGHT
DESCENT TRAJECTORIES
PARABOLIC FLIGHT

MIDDLE ATMOSPHERE
2003 3009
GS
EARTH ATMOSPHERE
#MIDDLE ATMOSPHERE
...MESOSPHERE
...MESOPAUSE
...STRATOSPHERE
...STRATOPAUSE
RT
AIR POLLUTION
% ATMOSPHERES
ATMOSPHERIC CHEMISTRY
ATMOSPHERIC CIRCULATION
ATMOSPHERIC COMPOSITION
CHEMOSPHERE
CLIMATOLOGY
EQUATORIAL ATMOSPHERE
FREE ATMOSPHERE
HETEROSPHERE
HOMOSPHERE
LOWER ATMOSPHERE
MIDLATITUDE ATMOSPHERE
TROPopause
UPPER ATMOSPHERE
ZONAL FLOW (METEOROLOGY)

MIDDLE EAR
0404 0405 0408
GS
ANATOMY
. SENSE ORGANS
..EAR
..#MIDDLE EAR
RT SEMICIRCULAR CANALS

MIDDLE EAR PRESSURE

O404 0408
GS PRESSURE
#MIDDLE EAR PRESSURE
RT EAR PRESSURE TEST
EARDRUMS

MIDLATITUDE ATMOSPHERE
1301 1302 1308 2003
GS EARTH ATMOSPHERE
#MIDLATITUDE ATMOSPHERE
ENVIRONMENTS
#MIDLATITUDE ATMOSPHERE
RT EARTH IONOSPHERE
MIDDLE ATMOSPHERE
SPORADIC E LAYER

MIDLATITUDES
USE TEMPERATE REGIONS

MIE SCATTERING
0710 1902 2402 2403
UF MIE THEORY
GS SCATTERING
.WAVE SCATTERING
..ELECTROMAGNETIC SCATTERING
...#MIE SCATTERING
...RAYLEIGH SCATTERING

MIE THEORY
USE MIE SCATTERING

MIG AIRCRAFT
0201
GS ATTACK AIRCRAFT
.FIGHTER AIRCRAFT
.#MIG AIRCRAFT
SINGLE ENGINE AIRCRAFT
#MIG AIRCRAFT
SUPERSONIC AIRCRAFT
#MIG AIRCRAFT
RT % AIRCRAFT

MIGRATION
0402 0408
RT BEHAVIOR
PHENOLOGY
WATERFOWL

MIL AIRCRAFT
0204 0206 0207
RT % AIRCRAFT

MILANKOVITCH THEORY
USE CLIMATOLOGY

MILITARY AIR FACILITIES
1101 3401
UF AIRCRAFT BASES
RT AIR TRAFFIC CONTROL
% AIRCRAFT
AIRCRAFT CARRIERS
AIRPORTS
% FACILITIES
% FIELDS
HANGARS
HELIPORTS
LANDING AIDS
LANDING MATS
NAVIGATION AIDS
STATIONS

% MILITARY AIRCRAFT
0206 0207 0209 3401
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
UF BOEING MILITARY AIRCRAFT
CESSNA MILITARY AIRCRAFT
CHANCE-VOUGHT MILITARY AIRCRAFT
CONVAIR MILITARY AIRCRAFT
CURTISS-WRIGHT MILITARY AIRCRAFT
FAIRCHILD MILITARY AIRCRAFT
HILLER MILITARY AIRCRAFT
REPUBLIC MILITARY AIRCRAFT
A-37 AIRCRAFT
AH-1G HELICOPTER
AH-63 HELICOPTER
AH-64 HELICOPTER
% AIRCRAFT
AIRCRAFT CARRIERS
AIRCRAFT SURVIVABILITY
AIRSHIPS
ALPHA JET AIRCRAFT
ANTISUBMARINE WARFARE AIRCRAFT
ARMED FORCES
ARMED FORCES (FOREIGN)
ARMED FORCES (UNITED STATES)
ATTACK AIRCRAFT
ATTACKING (ASSAULTING)
AWACS AIRCRAFT
B-1 AIRCRAFT
B-2 AIRCRAFT
BOMBER AIRCRAFT
C-1A AIRCRAFT
CARGO AIRCRAFT
CH-62 HELICOPTER
CL-600 CHALLENGER AIRCRAFT
DRONE AIRCRAFT
DRONE VEHICLES
E-2 AIRCRAFT

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# NASA THESAURUS HIERARCHICAL UPDATE

E-3A AIRCRAFT  
 E-4A AIRCRAFT  
 FIGHTER AIRCRAFT  
 FIREBEE 2 TARGET DRONE AIRCRAFT  
 FV-12A AIRCRAFT  
 GLIDERS  
 GROUND EFFECT MACHINES  
 H-60 HELICOPTER  
 HARRIER AIRCRAFT  
 HELICOPTERS  
 JAGUAR AIRCRAFT  
 JET AIRCRAFT  
 LIGHT AIRCRAFT  
 % MILITARY AVIATION  
 MILITARY HELICOPTERS  
 MRCA AIRCRAFT  
 NUCLEAR PROPELLED AIRCRAFT  
 OBSERVATION AIRCRAFT  
 PANAVIA MILITARY AIRCRAFT  
 PASSENGER AIRCRAFT  
 PILOTLESS AIRCRAFT  
 RECONNAISSANCE AIRCRAFT  
 RESEARCH AIRCRAFT  
 ROTARY WING AIRCRAFT  
 S-3 AIRCRAFT  
 SHORT TAKEOFF AIRCRAFT  
 SR-71 AIRCRAFT  
 SUBMERSIBLE AIRCRAFT  
 TAILLESS AIRCRAFT  
 TANKER AIRCRAFT  
 TARGET DRONE AIRCRAFT  
 TERRAIN FOLLOWING AIRCRAFT  
 TRAINING AIRCRAFT  
 TRANSPORT AIRCRAFT  
 UTILITY AIRCRAFT  
 V-22 AIRCRAFT  
 V/STOL AIRCRAFT  
 VERTICAL TAKEOFF AIRCRAFT  
 WEAPON SYSTEMS  
 YC-14 AIRCRAFT  
 YF-12 AIRCRAFT  
 YF-16 AIRCRAFT  
 % MILITARY AVIATION  
 O206 O207 3401  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT % AERONAUTICS  
 AIR LAW  
 ARMED FORCES  
 AVIATION METEOROLOGY  
 BOMBER AIRCRAFT  
 FIGHTER AIRCRAFT  
 % MILITARY AIRCRAFT

RECONNAISSANCE AIRCRAFT  
 MILITARY COMPACT REACTORS  
 2201 2204 3401  
 UF MCR REACTORS  
 GS NUCLEAR REACTORS  
 . LIQUID COOLED REACTORS  
 . LIQUID METAL COOLED REACTORS  
 . #MILITARY COMPACT REACTORS  
 . NUCLEAR RESEARCH AND TEST REACTORS  
 . #MILITARY COMPACT REACTORS  
 MILITARY HELICOPTERS  
 O206 O207 3401  
 GS V/STOL AIRCRAFT  
 . ROTARY WING AIRCRAFT  
 . HELICOPTERS  
 . #MILITARY HELICOPTERS  
 . . . . AH-1G HELICOPTER  
 . . . . AH-64 HELICOPTER  
 . . . . BELL 214A HELICOPTER  
 . . . . BO-105 HELICOPTER  
 . . . . CH-3 HELICOPTER  
 . . . . CH-21 HELICOPTER  
 . . . . CH-34 HELICOPTER  
 . . . . CH-46 HELICOPTER  
 . . . . CH-47 HELICOPTER  
 . . . . CH-54 HELICOPTER  
 . . . . H-19 HELICOPTER  
 . . . . H-43 HELICOPTER  
 . . . . H-53 HELICOPTER  
 . . . . H-54 HELICOPTER  
 . . . . H-56 HELICOPTER  
 . . . . H-60 HELICOPTER  
 . . . . HC-3 HELICOPTER  
 . . . . HEAVY LIFT HELICOPTERS  
 . . . . CH-62 HELICOPTER  
 . . . . HH-43 HELICOPTER  
 . . . . OH-4 HELICOPTER  
 . . . . OH-5 HELICOPTER  
 . . . . OH-6 HELICOPTER  
 . . . . OH-13 HELICOPTER  
 . . . . OH-23 HELICOPTER  
 . . . . OH-58 HELICOPTER  
 . . . . P-531 HELICOPTER  
 . . . . QH-50 HELICOPTER  
 . . . . S-58 HELICOPTER  
 . . . . S-61 HELICOPTER  
 . . . . SA-321 HELICOPTER  
 . . . . SA-330 HELICOPTER  
 . . . . SH-3 HELICOPTER  
 . . . . SH-4 HELICOPTER  
 . . . . SIKORSKY WHIRLWIND HELICOPTER  
 . . . . UH-1 HELICOPTER  
 . . . . UH-2 HELICOPTER  
 RECONNAISSANCE AIRCRAFT  
 . . . . UH-34 HELICOPTER  
 . . . . UH-60A HELICOPTER  
 . . . . UH-61A HELICOPTER  
 . . . . WESTLAND WHIRLWIND HELICOPTER  
 . . . . XV-9A AIRCRAFT  
 RT % AIRCRAFT  
 ATTACK AIRCRAFT  
 LIGHT HELICOPTERS  
 % MILITARY AIRCRAFT  
 RECONNAISSANCE AIRCRAFT  
 MILITARY OPERATIONS  
 O207 3410  
 GS #MILITARY OPERATIONS  
 . COMBAT  
 . ELECTRONIC WARFARE  
 RT DEPLOYMENT  
 TACTICS  
 TANKS (COMBAT VEHICLES)  
 MILITARY PSYCHIATRY  
 USE MILITARY PSYCHOLOGY  
 MILITARY PSYCHOLOGY  
 O408 O410 3401 3402  
 UF MILITARY PSYCHIATRY  
 GS PSYCHOLOGY  
 #MILITARY PSYCHOLOGY  
 RT AVIATION PSYCHOLOGY  
 PSYCHIATRY  
 PSYCHOLOGICAL EFFECTS  
 PSYCHOLOGICAL TESTS  
 PSYCHOMETRICS  
 SPACE PSYCHOLOGY  
 MILITARY SPACECRAFT  
 3110 3401  
 GS #MILITARY SPACECRAFT  
 . DMSP SATELLITES  
 . RECONNAISSANCE SPACECRAFT  
 . INSPECTOR SATELLITE  
 . MIDAS SATELLITES  
 . . . . MIDAS 2 SATELLITE  
 . . . . MIDAS 3 SATELLITE  
 . . . . MIDAS 4 SATELLITE  
 . . . . MIDAS 5 SATELLITE  
 . . . . MIDAS 6 SATELLITE  
 . . . . MIDAS 7 SATELLITE  
 . . . . PHOTO RECONNAISSANCE SPACECRAFT  
 . . . . SAMOS  
 . . . . VELA SATELLITES  
 RT AEROSPACE PLANES  
 ARMED FORCES  
 ARTIFICIAL SATELLITES  
 COLUMBUS SPACE STATION

EVASIVE SATELLITES  
 MANNED SPACECRAFT  
 METEOROLOGICAL SATELLITES  
 % MILITARY VEHICLES  
 NAVIGATION SATELLITES  
 RECOVERABLE SPACECRAFT  
 RENDEZVOUS SPACECRAFT  
 SATELLITE NETWORKS  
 SPACE STATIONS  
 SPACE SURVEILLANCE (SPACEBORNE)  
 % SPACECRAFT  
 SYNCHRONOUS SATELLITES  
 UNMANNED SPACECRAFT  
 WEAPON SYSTEMS  
 MILITARY TECHNOLOGY  
 3401 3404  
 GS TECHNOLOGIES  
 #MILITARY TECHNOLOGY  
 RT ANTIMISSILE DEFENSE  
 ANTI-RADIATION MISSILES  
 ANTI-SUBMARINE WARFARE  
 ARMED FORCES (FOREIGN)  
 ARMY-NAVY INSTRUMENTATION PROGRAM  
 AWACS AIRCRAFT  
 BALLISTIC MISSILE EARLY WARNING  
 SYSTEM  
 DEFENSE COMMUNICATIONS SYSTEM (DCS)  
 DEFENSE INDUSTRY  
 DEFENSE PROGRAM  
 DEPLOYMENT  
 FLEET SATELLITE COMMUNICATION  
 SYSTEM  
 INTERSERVICE DATA EXCHANGE PROGRAM  
 LASER WEAPONS  
 LOGISTICS OVER THE SHORE (LOTS)  
 CARRIER  
 MISSILE DEFENSE  
 OPTICAL COUNTERMEASURES  
 RADAR HOMING MISSILES  
 SAFEGUARD SYSTEM  
 TACTICS  
 WEAPONS  
 WEAPONS DELIVERY  
 WEAPONS INDUSTRY  
 % MILITARY VEHICLES  
 0207 1102 3401  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT AERONAUTIC VEHICLES  
 AIRCRAFT CARRIERS  
 AMBULANCES  
 AMPHIBIOUS VEHICLES  
 ARMED FORCES  
 ARMED FORCES (FOREIGN)  
 ARMED FORCES (UNITED STATES)  
 AUTOMOBILES  
 BOATS  
 MILITARY SPACECRAFT  
 RECOVERY VEHICLES  
 RESEARCH VEHICLES  
 SHIPS  
 SUBMARINES  
 TANKS (COMBAT VEHICLES)  
 TRUCKS  
 UNDERWATER VEHICLES  
 % VEHICLES  
 WATER VEHICLES  
 MILK  
 0402 0505 0507  
 RT BEVERAGES  
 % FOOD  
 MILKY WAY GALAXY  
 3001  
 GS CELESTIAL BODIES  
 .GALAXIES  
 ..SPIRAL GALAXIES  
 ...MILKY WAY GALAXY  
 GALACTIC BULGE  
 ORION NEBULA  
 RADIO SOURCES (ASTRONOMY)  
 SOLAR NEIGHBORHOOD  
 STARS  
 MILLET  
 0409  
 GS FARM CROPS  
 .GRAINS (FOOD)  
 .#MILLET  
 PLANTS (BOTANY)  
 #MILLET  
 RT EARTH RESOURCES  
 FLOUR (FOOD)  
 % FOOD  
 GRASSES  
 MILLIMETER WAVES  
 0705 2402 2903  
 GS ELECTROMAGNETIC RADIATION  
 .RADIO WAVES  
 ..SHORT WAVE RADIATION  
 ...MICROWAVES  
 ...#MILLIMETER WAVES  
 RT BEAM PLASMA AMPLIFIERS  
 C BAND  
 CN EMISSION  
 CYCLOTRON RESONANCE DEVICES  
 DECIMETER WAVES  
 ELECTROMAGNETIC NOISE  
 EXTRATERRESTRIAL RADIO WAVES  
 EXTREMELY HIGH FREQUENCIES  
 FREQUENCIES  
 SOLAR RADIO EMISSION  
 SUBMILLIMETER WAVES  
 WAVELENGTHS  
 % MILLING  
 1504 1704 3404  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT COMMINUTION  
 COMPOUNDING  
 MILLING (MACHINING)  
 MILLING (MACHINING)  
 1504 1704  
 GS CUTTING  
 #MILLING (MACHINING)  
 MACHINING  
 #MILLING (MACHINING)  
 RT CHEMICAL MACHINING  
 GROOVING  
 METAL CUTTING  
 MILLING MACHINES  
 PLANING  
 MILLING (MIXING)  
 USE COMPOUNDING  
 MILLING MACHINES  
 1504 3404  
 GS TOOLS  
 .MACHINE TOOLS  
 .#MILLING MACHINES  
 RT GRINDING MACHINES  
 % MACHINERY  
 SHAPERS  
 MILLIVOLTMETERS  
 1406 2304  
 GS MEASURING INSTRUMENTS  
 .VOLTMMETERS  
 .#MILLIVOLTMETERS  
 RT GALVANOMETERS  
 MILLS RATIO  
 1902 1905  
 GS RATIOS  
 #MILLS RATIO

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                                                                                                                                                             | FAILURE<br>FAILURE ANALYSIS<br>LIFE (DURABILITY)<br>MORTALITY<br>PROBABILITY DENSITY FUNCTIONS<br>STATISTICAL ANALYSIS | RT                                                                                                                                                                                                                                                                                                                                                                                                                                   | ..SATURN SATELLITES<br>..#MIMAS<br>SATURN (PLANET) | MINERAL EXPLORATION<br>1306<br>GS<br>EXPLORATION<br>#MINERAL EXPLORATION<br>RT ANTHRACITE<br>EXCAVATION<br>MINERALS<br>MINES (EXCAVATIONS)<br>MINING                                                    |
| MILNE METHOD<br>1902 1903 3501<br>GS ANALYSIS (MATHEMATICS)<br>.NUMERICAL ANALYSIS<br>..APPROXIMATION<br>..#MILNE METHOD<br>RT DIFFERENTIAL EQUATIONS<br>% METHODOLOGY                                                                                                                         |                                                                                                                        | MIMD (COMPUTERS)<br>0800 0802 0803<br>UF MULTIPLE INSTRUCTION MULTIPLE DATA<br>STREAM<br>GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>..DIGITAL COMPUTERS<br>..PARALLEL COMPUTERS<br>..#MIMD (COMPUTERS)<br>RT ARCHITECTURE (COMPUTERS)<br>COMPUTER DESIGN<br>COMPUTER PROGRAMMING<br>CONCURRENT PROCESSING<br>INTERPROCESSOR COMMUNICATION<br>OPERATING SYSTEMS (COMPUTERS)<br>PARALLEL PROCESSING (COMPUTERS)<br>SIMD (COMPUTERS) |                                                    | MINERAL METABOLISM<br>0403 0404 0408<br>GS METABOLISM<br>#MINERAL METABOLISM<br>RT BODY FLUIDS<br>CALORIC REQUIREMENTS<br>ENDOCRINE SYSTEMS<br>SECRETIONS                                               |
| MILNE-THOMSON METHOD<br>1202 1809 3203<br>RT INCOMPRESSIBLE FLOW<br>% METHODOLOGY<br>NAVIER-STOKES EQUATION<br>VISCOUS FLOW                                                                                                                                                                    |                                                                                                                        | MIMO (CONTROL SYSTEMS)<br>0803 1003<br>UF MULTIPLE INPUT MULTIPLE OUTPUT<br>RT % CONTROL<br>CONTROL STABILITY<br>CONTROL SYSTEMS DESIGN<br>CONTROL THEORY<br>FEEDBACK CONTROL<br>% SYSTEMS<br>SYSTEMS STABILITY                                                                                                                                                                                                                      |                                                    | MINERAL OILS<br>0405 1806 1808<br>GS OILS<br>#MINERAL OILS<br>RT LUBRICATING OILS                                                                                                                       |
| MIM (SEMICONDUCTORS)<br>0906<br>UF METAL-INSULATOR-METAL<br>SEMICONDUCTORS<br>ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>..SEMICONDUCTOR DEVICES<br>..#MIM (SEMICONDUCTORS)<br>SEMICONDUCTORS (MATERIALS)<br>#MIM (SEMICONDUCTORS)<br>RT SIS (SEMICONDUCTORS)                             |                                                                                                                        | MINE DETECTORS<br>1409 3302 3401<br>GS WARNING SYSTEMS<br>#MINE DETECTORS<br>RT % DETECTORS<br>WARNING                                                                                                                                                                                                                                                                                                                               |                                                    | MINERALOGY<br>1306 1308 3009<br>RT CHONDRULE<br>CRYSTALLOGRAPHY<br>GEOCHEMISTRY<br>GEOLOGY<br>MINERAL DEPOSITS<br>MINERALS<br>PETROLOGY<br>% PHYSICAL SCIENCES                                          |
| MIM DIODES<br>0906<br>UF METAL-INSULATOR-METAL DIODES<br>ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>..SEMICONDUCTOR DEVICES<br>...JUNCTION DIODES<br>...#MIM DIODES<br>ELECTRON TUNNELING<br>MSM (SEMICONDUCTORS)<br>NEGATIVE RESISTANCE DEVICES<br>SEMICONDUCTOR DIODES<br>TUNNEL DIODES |                                                                                                                        | MINER RULE<br>USE PALMGREN-MINER RULE<br>MINERAL DEPOSITS<br>1305 1306 1308 1806<br>RT CONTACTS (GEOLOGY)<br>DREDGING<br>EARTH RESOURCES<br>EXCAVATION<br>GEOLOGY<br>LUNAR MINING<br>MINERALOGY<br>MINERALS<br>MINES (EXCAVATIONS)<br>MINING                                                                                                                                                                                         |                                                    | MINERALS<br>1306 1806 3009<br>UF APATITES<br>ORES<br>GS #MINERALS<br>.AKERMANITE<br>.AMPHIBOLES<br>.ANATASE<br>.ARAGONITE<br>.ASBESTOS<br>.BARITE<br>.BASTNASITE<br>.BERYL<br>..ALEXANDRITE<br>BLOEDITE |
| MIMAS<br>3008<br>GS CELESTIAL BODIES<br>.NATURAL SATELLITES<br>..ICY SATELLITES<br>..#MIMAS                                                                                                                                                                                                    |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |                                                                                                                                                                                                         |

| 1306                        | RT                                 | 1306                            | RT |
|-----------------------------|------------------------------------|---------------------------------|----|
| .BRUCITE                    | .SERPENTINE                        | QUARRIES                        |    |
| .CALCITE                    | .SIDERITES                         | CORE SAMPLING                   |    |
| .CHROMITES                  | .SPINEL                            | DRAINAGE                        |    |
| .COHENITE                   | .SPODUMENE                         | EXPLOITATION                    |    |
| .CORDIERITE                 | .TALC                              | EXPLORATION                     |    |
| .CRYOLITE                   | .TOURMALINE                        | LUNAR MINING                    |    |
| .DAWSONITE                  | .VERMICULITE                       | MATERIALS HANDLING              |    |
| .DOLOMITE (MINERAL)         | .WURTZITE                          | MINERAL DEPOSITS                |    |
| .EUXENITE                   | .ZINCBLENDE                        | MINERAL EXPLORATION             |    |
| .FAYALITE                   | ALUMINUM SILICATES                 | % MINES                         |    |
| .FELDSPARS                  | ANDESITE                           | MINING                          |    |
| .FLUORITE                   | BAUXITE                            | PITS (EXCAVATIONS)              |    |
| .FLUORSPAR                  | BENEFICIATION                      | RESERVES                        |    |
| .GARNETS                    | BIOGEOCHEMISTRY                    | STRATIGRAPHY                    |    |
| ..GADOLINIUM-GALLIUM GARNET | BONE MINERAL CONTENT               | STRIP MINING                    |    |
| ..YTTRIUM-ALUMINUM GARNET   | BOREHOLES                          | SUBSIDENCE                      |    |
| ..YTTRIUM-IRON GARNET       | CALCIUM SILICATES                  | UNDERGROUND EXPLOSIONS          |    |
| .GEULENITE                  | CRYSTALLITES                       | UNDERGROUND STORAGE             |    |
| .GRAPHITE                   | DIORITE                            | UNDERGROUND STRUCTURES          |    |
| ..PYROLYTIC GRAPHITE        | DUNITE                             | WASTE DISPOSAL                  |    |
| .GYPSUM                     | EARTH RESOURCES                    |                                 |    |
| .HEXAHEDRITE                | FELSITE                            | MINES (ORDNANCE)                |    |
| .ILLITE                     | FLUOROSILICATES                    | 3302 3401                       |    |
| .ILMENITE                   | GEOLOGY                            | GS WEAPONS                      |    |
| .IRON ORES                  | IGNEOUS ROCKS                      | #MINES (ORDNANCE)               |    |
| ..HEMATITE                  | IMPACT MELTS                       | RT AMMUNITION                   |    |
| .KAMACITE                   | LAVA                               | % MINES                         |    |
| .KAOLINITE                  | LIMESTONE                          |                                 |    |
| .KREEP                      | LUNAR SOIL                         | MINIATURE ELECTRONIC EQUIPMENT  |    |
| ..LIMONITE                  | MINERAL DEPOSITS                   | 0903 0905 1002                  |    |
| .MAGNETITE                  | MINERAL EXPLORATION                | GS ELECTRONIC EQUIPMENT         |    |
| .MERWINITE                  | MINERALOGY                         | #MINIATURE ELECTRONIC EQUIPMENT |    |
| .MICA                       | MONAZITE SANDS                     | RT CIRCUITS                     |    |
| ..BIOTITE                   | MULLITES                           | % ELECTRIC EQUIPMENT            |    |
| ..FLUOROPHLOGOPITE          | % NUTRIENTS                        | ELECTRONIC MODULES              |    |
| ..MUSCOVITE                 | OBSIDIAN                           | EQUIPMENT                       |    |
| .MONTICELLITE               | POTASSIUM SILICATES                | MICROMINIATURIZATION            |    |
| .MONTMORILLONITE            | ROCKS                              | MICROMINIATURIZED ELECTRONIC    |    |
| .NEPHELINE                  | RUTILE                             | DEVICES                         |    |
| .NEPHELITE                  | SHALES                             | MICROMODULES                    |    |
| .OLIVINE                    | SILICATES                          | MINIATURIZATION                 |    |
| ..FORSTERITE                | SODIUM SILICATES                   | MOLECULAR ELECTRONICS           |    |
| .PEROVSKITES                | SOILS                              | PRINTED CIRCUITS                |    |
| .PROUSTITE                  | UNDERGROUND ACOUSTICS              | SOLID STATE DEVICES             |    |
| .PYRITES                    | ZEOLITES                           | SUBMINIATURIZATION              |    |
| .PYROPHYLLITE               |                                    | THIN FILMS                      |    |
| .PYROXENES                  |                                    |                                 |    |
| ..ENSTATITE                 | % MINES                            | MINIATURIZATION                 |    |
| .PYRRHOTITE                 | 1306                               | 0902 1002                       |    |
| ..TROILITE                  | SN (USE OF A MORE SPECIFIC TERM IS | GS #MINIATURIZATION             |    |
| .QUARTZ                     | RECOMMENDED--CONSULT THE TERMS     | .MICROMINIATURIZATION           |    |
| ..COESITE                   | LISTED BELOW)                      | .SUBMINIATURIZATION             |    |
| ..STISHOVITE                | RT                                 | CIRCUITS                        |    |
| .SCHEELITE                  | MINES (EXCAVATIONS)                | MINIATURE ELECTRONIC EQUIPMENT  |    |
| .SCHREIBERSITE              | MINES (ORDNANCE)                   |                                 |    |
|                             | MINES (EXCAVATIONS)                |                                 |    |



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CARRIER LIFETIME
DIFFUSION LENGTH
ELECTRON MOBILITY
ELECTRONS
HOLES (ELECTRON DEFICIENCIES)
SEMICONDUCTORS (MATERIALS)

MINOS COMPUTER
0801
GS DATA PROCESSING EQUIPMENT
.COMPUTERS
.#MINOS COMPUTER

MINUTEMAN ICBM
3101 3401
UF MINUTEMAN MISSILES
GS MISSILES
.BALLISTIC MISSILES
..INTERCONTINENTAL BALLISTIC MISSILES
..#MINUTEMAN ICBM
.SURFACE TO SURFACE MISSILES
..INTERCONTINENTAL BALLISTIC MISSILES
RT M-55 ENGINE
M-56 ENGINE
M-57 ENGINE
MULTISTAGE ROCKET VEHICLES
SOLID PROPELLANT ROCKET ENGINES
SPACE WEAPONS

MINUTEMAN MISSILES
USE MINUTEMAN ICBM

M1051S
O404
RT EYE (ANATOMY)
OPHTHALMOLOGY
TETRAD THEORY
VISION

MIR SPACE STATION
3009 3109 3409
GS ARTIFICIAL SATELLITES
.SPACESTATIONS
.#MIR SPACE STATION
MANNED SPACECRAFT
#MIR SPACE STATION
SOVIET SPACECRAFT
#MIR SPACE STATION
STATIONS
.SPACESTATIONS
.#MIR SPACE STATION
RT SPACE BASES

SPACE LABORATORIES
SPACECRAFT DOCKING
U.S.S.R. SPACE PROGRAM

MIRA CETI STAR
USE OMICRON CETI STAR

MIRA VARIABLES
2306 3001 3006
UF LONG PERIOD VARIABLES
GS CELESTIAL BODIES
.STARS
...LATE STARS
...COOL STARS
...#MIRA VARIABLES
....OMICRON CETI STAR
....VARIABLE STARS
..#MIRA VARIABLES
...OMICRON CETI STAR
..ASYMPTOTIC GIANT BRANCH STARS
RT CARBON STARS
M STARS
RED GIANT STARS
S STARS
STELLAR OSCILLATIONS
SUPERGIANT STARS

MIRAGE AIRCRAFT
O207
GS ATTACK AIRCRAFT
.FIGHTER AIRCRAFT
.#MIRAGE AIRCRAFT
...MIRAGE 3 AIRCRAFT
DASSAULT AIRCRAFT
#MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
JET AIRCRAFT
#MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
MONOPLANES
#MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
OBSERVATION AIRCRAFT
.MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
RECONNAISSANCE AIRCRAFT
.MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
SINGLE ENGINE AIRCRAFT
.MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
SUPERSONIC AIRCRAFT
.MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
TAILLESS AIRCRAFT
#MIRAGE 3 AIRCRAFT

MIRANDA
1901 3001 3007 3008
GS CELESTIAL BODIES
.NATURAL SATELLITES
..URANUS SATELLITES
..#MIRANDA
RT URANUS (PLANET)

MIRANDA SATELLITE
3107
GS ARTIFICIAL SATELLITES
.SYNCHRONOUS SATELLITES
.#MIRANDA SATELLITE
RT ATTITUDE CONTROL

MIROS SYSTEM
2306 2310
UF MODULATING RETRODIRECTIVE OPTICS
GS MODULATION
.LIGHT MODULATION
.#MIROS SYSTEM
RT OPTICAL MEASURING INSTRUMENTS
% SYSTEMS

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## NASA THESAURUS HIERARCHICAL UPDATE

|                                   |                                 |                                  |
|-----------------------------------|---------------------------------|----------------------------------|
| MIRROR FUSION                     | DISORIENTATION)                 | FINNED BODIES                    |
| 2307                              | UF MISORIENTATION               | ROCKET ENGINE CASES              |
| RT                                | RT ATTITUDE (INCLINATION)       | SLENDER BODIES                   |
| FUSION REACTORS                   | DISORIENTATION                  | STREAMLINED BODIES               |
| MAGNETIC MIRRORS                  | POSITION (LOCATION)             |                                  |
| NUCLEAR FUSION                    |                                 |                                  |
| PLASMA CONTROL                    | MISCIBILITY                     | MISSILE CASES                    |
| TANDEM MIRRORS                    | USE SOLUBILITY                  | USE MISSILE BODIES               |
| THERMAL BARRIERS (PLASMA CONTROL) |                                 |                                  |
|                                   |                                 |                                  |
| MIRROR POINT                      | MISCIBILITY GAP                 | MISSILE COMPONENTS               |
| 1409 2310 2402                    | O601 0603                       | O101 2806 3101                   |
| RT MAGNETIC MIRRORS               | RT PHASE SEPARATION (MATERIALS) | GS #MISSILE COMPONENTS           |
| RADIATION BELTS                   | SOLUBILITY                      | .MISSILE ANTENNAS                |
|                                   | SPACE PROCESSING                | .MISSILE BODIES                  |
|                                   | TEMPERATURE DEPENDENCE          | RT % COMPONENTS                  |
| MIRRORS                           |                                 | ENGINES                          |
| 1412 2306 2310 2903               |                                 | FINIS                            |
| GS #MIRRORS                       | MISFETS                         | NOSE CONES                       |
| .CELESCOPES                       | USE FIELD EFFECT TRANSISTORS    | WARHEADS                         |
| .ETALONS                          |                                 | WINGS                            |
| .FRESNEL REFLECTORS               | MISMATCH (ELECTRICAL)           |                                  |
| .MAGNETIC MIRRORS                 | O702                            |                                  |
| .TANDEM MIRRORS                   | RT ELECTRICAL MEASUREMENT       | MISSILE CONFIGURATIONS           |
| .PARABOLOID MIRRORS               | IMPEDANCE MEASUREMENT           | O101 3101                        |
| .ROTATING MIRRORS                 | MATCHING                        | GS #MISSILE CONFIGURATIONS       |
| .SOLETTAS                         |                                 | .SANDPIPER TARGET MISSILE        |
| CASSEGRAIN OPTICS                 | MISORIENTATION                  | RT AERODYNAMIC CONFIGURATIONS    |
| CIRCUMSOLAR TELESCOPES            | USE MISALIGNMENT                | AIRCRAFT CONFIGURATIONS          |
| COLLIMATORS                       |                                 | % CONFIGURATIONS                 |
| HELIOSTATS                        |                                 | HAMMERHEAD CONFIGURATION         |
| OPTICAL EQUIPMENT                 |                                 | LAUNCH VEHICLE CONFIGURATIONS    |
| OPTICAL MATERIALS                 | MISS DISTANCE                   | MISSILES                         |
| OPTICAL RESONATORS                | GS DISTANCE                     | MULTIENGINE VEHICLES             |
| % OPTICS                          | #MISS DISTANCE                  | PATRIOT MISSILE                  |
| REFLECTING TELESCOPES             | RT ACCURACY                     | PROPULSION SYSTEM CONFIGURATIONS |
| REFLECTORS                        | AIR TO SURFACE MISSILES         | ROCKET ENGINES                   |
| SOLAR COLLECTORS                  |                                 | ROCKET VEHICLES                  |
| SOLAR REFLECTORS                  | MISSILE ANTENNAS                |                                  |
| SPECULAR REFLECTION               | O701 0702 0901 3101             | MISSILE CONSTRUCTION             |
| TELESCOPES                        | GS ANTENNAS                     | USE MISSILE STRUCTURES           |
| X RAY OPTICS                      | #MISSILE ANTENNAS               |                                  |
|                                   | MISSILE COMPONENTS              | MISSILE CONTROL                  |
| MIS (SEMICONDUCTORS)              | #MISSILE ANTENNAS               | O101 2102 3101                   |
| O603 1704 1804 2602               | RT AIRCRAFT ANTENNAS            | UF MISSILE GUIDANCE              |
| UF METAL INSULATOR SEMICONDUCTORS | DIRECTIONAL ANTENNAS            | MISSILE STABILIZATION            |
| GS ELECTRONIC EQUIPMENT           | MICROWAVE ANTENNAS              | RT ACTUATORS                     |
| .SOLID STATE DEVICES              |                                 | ANALOG COMPUTERS                 |
| ..SEMICONDUCTOR DEVICES           | MISSILE BODIES                  | ATTITUDE CONTROL                 |
| ..#MIS (SEMICONDUCTORS)           | O101 0201 2806 3101             | AUTOMATIC CONTROL                |
| SEMICONDUCTORS (MATERIALS)        | UF MISSILE CASES                | AUTOMATIC FLIGHT CONTROL         |
| #MIS (SEMICONDUCTORS)             | GS MISSILE COMPONENTS           | BEAM RIDER GUIDANCE              |
| RT SIS (SEMICONDUCTORS)           | #MISSILE BODIES                 | % CONTROL                        |
|                                   | RT AIRFRAMES                    | DIRECTIONAL CONTROL              |
|                                   | AXISYMMETRIC BODIES             | FLIGHT CONTROL                   |
| MISALIGNMENT                      | BLUNT BODIES                    | GROUND BASED CONTROL             |
| 3408                              | % BODIES                        | HOMING                           |
| SN (EXCLUDES PSYCHOLOGICAL        | CASES (CONTAINERS)              | LASER GUIDANCE                   |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

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PRELAUNCH TESTS
PROPELLANT TESTS
STABILITY TESTS
STATIC TESTS
TEST FIRING
TEST VEHICLES
% TESTS
WIND TUNNEL STABILITY TESTS

MISSILE TRACKING
0709 1109 3101
GS TRACKING (POSITION)
#MISSILE TRACKING
RT LASER TARGET DESIGNATORS
POLYSTATION DOPPLER TRACKING SYSTEM
RANGE AND RANGE RATE TRACKING
SPACE DETECTION AND TRACKING SYSTEM
SPACECRAFT TRACKING
TRACKING NETWORKS
TRACKING STATIONS

MISSILE TRAJECTORIES
2102 3006 3101
GS TRAJECTORIES
#MISSILE TRAJECTORIES
RT ASCENT TRAJECTORIES
BALLISTIC TRAJECTORIES
COBRA DANE (RADAR)
DESCENT TRAJECTORIES
FLIGHT MECHANICS
FLIGHT PATHS
IMPACT PREDICTION
PARABOLIC FLIGHT
REENTRY TRAJECTORIES
SPINNING UNGUIDED ROCKET TRAJECTORY
UNDERWATER TRAJECTORIES

MISSILE VIBRATION
0201 2308 3101
GS VIBRATION
.STRUCTURAL VIBRATION
.#MISSILE VIBRATION
BENDING VIBRATION
BREATHING VIBRATION
FLUTTER
LINEAR VIBRATION
RANDOM VIBRATION
SELF INDUCED VIBRATION
SUPERSONIC FLUTTER
TORSIONAL VIBRATION
TRANSONIC FLUTTER

MISSILES
3101 3106 3401

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## GS #MISSILES

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.AIR SLEW MISSILES
.AIR TO AIR MISSILES
.FALCON MISSILE
.MATRA MISSILE
.SIDEWINDER MISSILES
.SPARRROW MISSILES
.SPARRROW 2 MISSILE
.SPARRROW 3 MISSILE
.AIR TO SURFACE MISSILES
.BULLPUP MISSILES
.CONDOR MISSILE
.HARPOON MISSILE
.HOUND DOG MISSILE
.MAVERICK MISSILES
.QUAIL MISSILE
.SHRIKE MISSILE
.ANTELOPE MISSILE
.ANTIAIRCRAFT MISSILES
.BOMARC MISSILES
.FALCON MISSILE
.MAULER MISSILE
.NIKE-AJAX MISSILE
.NIKE-HERCULES MISSILE
.REDEYE MISSILE
.SIAM MISSILES
.SIDEWINDER MISSILES
.TARTAR MISSILE
.TERRIER MISSILE
.ANTIMISSILE MISSILES
.MAULER MISSILE
.NIKE-ZEUS MISSILE
.SPARTAN MISSILE
.SPRINT MISSILE
.ANTIRADIATION MISSILES
.ANTISHIP MISSILES
.BALLISTIC MISSILES
.FIELD ARMY BALLISTIC MISSILES
.SUBROC MISSILE
.INTERCONTINENTAL BALLISTIC MISSILES
...ATLAS ICBM
...ATLAS D ICBM
...ATLAS E ICBM
...ATLAS F ICBM
...MINUTEMAN ICBM
...TITAN ICBM
...TITAN 1 ICBM
...TITAN 2 ICBM
.INTERMEDIATE RANGE BALLISTIC MISSILES
...BLUE STREAK MISSILE
...JUPITER MISSILE
...POLARIS MISSILES
...POLARIS A1 MISSILE

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...POLARIS A2 MISSILE
...POLARIS A3 MISSILE
.PERSHING MISSILE
.POSEIDON MISSILES
.SHORT RANGE BALLISTIC MISSILES
.SKYBOLT MISSILE
.V-2 MISSILE
.BLUE STEEL MISSILE
.BUMBLEBEE PROJECT
.CORVUS MISSILE
.OSPREY MISSILE
.PRECISION GUIDED PROJECTILES
.RADAR HOMING MISSILES
.RAMJET MISSILES
.NAVAHO MISSILE
.SUPERSONIC LOW ALTITUDE MISSILE
.SANDPIPER TARGET MISSILE
.SS-11 MISSILE
.SURFACE TO AIR MISSILES
.BLUE GOOSE MISSILE
.BOMARC MISSILES
...BOMARC A MISSILE
...BOMARC B MISSILE
.CHAPARRAL MISSILE
.HAWK MISSILE
.MAULER MISSILE
.NIKE MISSILES
...NIKE-AJAX MISSILE
...NIKE-HERCULES MISSILE
...NIKE-ZEUS MISSILE
.PATRIOT MISSILE
.REDEYE MISSILE
.SPRINT MISSILE
.TALOS MISSILE
.TARTAR MISSILE
.TERRIER MISSILE
.SURFACE TO SURFACE MISSILES
.ANTITANK MISSILES
...SHILLELAGH MISSILES
...TOW MISSILES
.CORPORAL MISSILE
.CRUISE MISSILES
...NAVAHO MISSILE
...TOMAHAWK MISSILES
.FLEET BALLISTIC MISSILES
...POLARIS A1 MISSILE
...POLARIS A2 MISSILE
...POLARIS A3 MISSILE
.POSEIDON MISSILES
.SUBROC MISSILE
.INTERCONTINENTAL BALLISTIC MISSILES
...ATLAS ICBM
...ATLAS D ICBM
...ATLAS E ICBM

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |  |  |  |
|------------------------------------|--|--|--|
| VOYAGER 1977 MISSION               |  |  |  |
| MISSISSIPPI                        |  |  |  |
| 1305                               |  |  |  |
| GS                                 |  |  |  |
| NATIONS                            |  |  |  |
| .UNITED STATES                     |  |  |  |
| .#MISSISSIPPI                      |  |  |  |
| RT                                 |  |  |  |
| GULF OF MEXICO                     |  |  |  |
| MISSISSIPPI DELTA (LA)             |  |  |  |
| 1305                               |  |  |  |
| GS                                 |  |  |  |
| LANDFORMS                          |  |  |  |
| .DELTA                             |  |  |  |
| .#MISSISSIPPI DELTA (LA)           |  |  |  |
| RT                                 |  |  |  |
| LOUISIANA                          |  |  |  |
| RIVERS                             |  |  |  |
| MISSISSIPPI RIVER (US)             |  |  |  |
| 1305                               |  |  |  |
| GS                                 |  |  |  |
| RIVERS                             |  |  |  |
| #MISSISSIPPI RIVER (US)            |  |  |  |
| RT                                 |  |  |  |
| DRAINAGE PATTERNS                  |  |  |  |
| EARTH RESOURCES                    |  |  |  |
| FLOODS                             |  |  |  |
| RESOURCES                          |  |  |  |
| RIVER BASINS                       |  |  |  |
| MISSOURI                           |  |  |  |
| 1305                               |  |  |  |
| GS                                 |  |  |  |
| NATIONS                            |  |  |  |
| .UNITED STATES                     |  |  |  |
| .#MISSOURI                         |  |  |  |
| RT                                 |  |  |  |
| MISSOURI RIVER (US)                |  |  |  |
| ST LOUIS-KANSAS CITY CORRIDOR (MO) |  |  |  |
| MISSOURI RIVER (US)                |  |  |  |
| 1305                               |  |  |  |
| GS                                 |  |  |  |
| RIVERS                             |  |  |  |
| #MISSOURI RIVER (US)               |  |  |  |
| RT                                 |  |  |  |
| IOWA                               |  |  |  |
| KANSAS                             |  |  |  |
| MISSOURI                           |  |  |  |
| MONTANA                            |  |  |  |
| NEBRASKA                           |  |  |  |
| NORTH DAKOTA                       |  |  |  |
| RIVER BASINS                       |  |  |  |
| SOUTH DAKOTA                       |  |  |  |
| UNITED STATES                      |  |  |  |
| VALLEYS                            |  |  |  |
| MISSOURI RIVER BASIN (US)          |  |  |  |
| 1307                               |  |  |  |
| GS                                 |  |  |  |
| LANDFORMS                          |  |  |  |
| .STRUCTURAL BASINS                 |  |  |  |
| ..RIVER BASINS                     |  |  |  |
| ..#MISSOURI RIVER BASIN (US)       |  |  |  |
| RT                                 |  |  |  |
| WATERSHEDS                         |  |  |  |
| MIST                               |  |  |  |
| 1301                               |  |  |  |
| SN                                 |  |  |  |
| GS                                 |  |  |  |
| PARTICLES                          |  |  |  |
| #MIST                              |  |  |  |
| RT                                 |  |  |  |
| AEROSOLS                           |  |  |  |
| DISPERSIONS                        |  |  |  |
| FOG                                |  |  |  |
| FOG DISPERSAL                      |  |  |  |
| HAZE                               |  |  |  |
| HAZE DETECTION                     |  |  |  |
| PRECIPITATION (METEOROLOGY)        |  |  |  |
| MISTUNING (TURBOMACHINERY)         |  |  |  |
| O102                               |  |  |  |
| 1504                               |  |  |  |
| O104                               |  |  |  |
| RT                                 |  |  |  |
| ROTATING DISKS                     |  |  |  |
| %                                  |  |  |  |
| ROTOR BLADES                       |  |  |  |
| ROTOR BLADES (TURBOMACHINERY)      |  |  |  |
| ROTORS                             |  |  |  |
| FLOODS                             |  |  |  |
| TUNING                             |  |  |  |
| TURBOMACHINE BLADES                |  |  |  |
| VIBRATION                          |  |  |  |
| MITOCHONDRIA                       |  |  |  |
| O403                               |  |  |  |
| O406                               |  |  |  |
| GS                                 |  |  |  |
| ORGANELLES                         |  |  |  |
| #MITOCHONDRIA                      |  |  |  |
| RT                                 |  |  |  |
| CELLS (BIOLOGY)                    |  |  |  |
| CYTOLOGY                           |  |  |  |
| MITOSIS                            |  |  |  |
| O404                               |  |  |  |
| O406                               |  |  |  |
| GS                                 |  |  |  |
| CYTOGENESIS                        |  |  |  |
| #MITOSIS                           |  |  |  |
| RT                                 |  |  |  |
| CELL DIVISION                      |  |  |  |
| CELLS (BIOLOGY)                    |  |  |  |
| CHROMOSOMES                        |  |  |  |
| CYTOLOGY                           |  |  |  |
| CYTOPLASM                          |  |  |  |
| MUTATIONS                          |  |  |  |
| PHYSIOLOGY                         |  |  |  |
| REPRODUCTION (BIOLOGY)             |  |  |  |
| MITRA                              |  |  |  |
| O402                               |  |  |  |
| RT                                 |  |  |  |
| FUNGI                              |  |  |  |
| PLANTS (BOTANY)                    |  |  |  |
| MIUS                               |  |  |  |
| USE                                |  |  |  |
| MODULAR INTEGRATED UTILITY SYSTEM  |  |  |  |
| MIXING                             |  |  |  |
| O602                               |  |  |  |
| GS                                 |  |  |  |
| #MIXING                            |  |  |  |
| .COLLOIDING                        |  |  |  |
| MIXED CRYSTALS                     |  |  |  |
| 1704                               |  |  |  |
| 2601                               |  |  |  |
| 2603                               |  |  |  |
| GS                                 |  |  |  |
| CRYSTALS                           |  |  |  |
| #MIXED CRYSTALS                    |  |  |  |
| RT                                 |  |  |  |
| POWDER METALLURGY                  |  |  |  |
| SINTERING                          |  |  |  |
| MIXED FLOW                         |  |  |  |
| USE                                |  |  |  |
| MULTIPHASE FLOW                    |  |  |  |
| MIXED OXIDES                       |  |  |  |
| 2202                               |  |  |  |
| GS                                 |  |  |  |
| CHALCOGENIDES                      |  |  |  |
| .OXIDES                            |  |  |  |
| ..METAL OXIDES                     |  |  |  |
| ..#MIXED OXIDES                    |  |  |  |
| ....BSCCO SUPERCONDUCTORS          |  |  |  |
| ....YBCO SUPERCONDUCTORS           |  |  |  |
| HIGH TEMPERATURE SUPERCONDUCTORS   |  |  |  |
| NUCLEAR FUELS                      |  |  |  |
| PLUTONIUM OXIDES                   |  |  |  |
| STRONTIUM OXIDES                   |  |  |  |
| URANIUM OXIDES                     |  |  |  |
| MIXERS                             |  |  |  |
| O602                               |  |  |  |
| SN                                 |  |  |  |
| RT                                 |  |  |  |
| ADMINISTRATIVE                     |  |  |  |
| AERATION                           |  |  |  |
| AEROSOLS                           |  |  |  |
| AGITATION                          |  |  |  |
| BAFFLES                            |  |  |  |
| BLOWERS                            |  |  |  |
| CARBURETORS                        |  |  |  |
| COALESCING                         |  |  |  |
| CONTACTORS                         |  |  |  |
| %                                  |  |  |  |
| DIFFUSERS                          |  |  |  |
| %                                  |  |  |  |
| DISPERSION                         |  |  |  |
| FEEDERS                            |  |  |  |
| GRINDING MILLS                     |  |  |  |
| MIXING                             |  |  |  |
| MIXTURES                           |  |  |  |
| PADDLES                            |  |  |  |
| PLOWS                              |  |  |  |
| PLUNGERS                           |  |  |  |
| SEPARATORS                         |  |  |  |
| SHAKERS                            |  |  |  |
| SPRAYERS                           |  |  |  |
| STIRRING                           |  |  |  |
| TUMBLING MOTION                    |  |  |  |

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                | .COMPOUNDING<br>.DISSOLVING<br>.HOMOGENIZING<br>.LAMINAR MIXING<br>.PREMIXING<br>.SIGNAL MIXING<br>.SUSPENDING (MIXING)<br>.TURBULENT MIXING<br>AERATION<br>AGITATION<br>BLOWING<br>CHOKES<br>DIFFUSION<br>DILUTION<br>GRINDING (COMMINUTION)<br>JET MIXING FLOW<br>LIQUID INJECTION<br>METAL POWDER<br>MIXERS<br>MIXING LAYERS (FLUIDS)<br>MIXING RATIOS<br>MIXTURES<br>PREMIXED FLAMES<br>SEPARATION<br>SHAKING<br>SPRAYING<br>SWIRLING<br>TANGLING<br>TRAPPED VORTICES<br>TURBULENCE<br>VORTICES | MIXING LAYERS (FLUIDS)<br>1202<br>RT<br>ADVECTION<br>ATMOSPHERIC BOUNDARY LAYER<br>ATMOSPHERIC STRATIFICATION<br>BOUNDARY LAYERS<br>CONVECTION<br>EKMAN LAYER<br>JET MIXING FLOW<br>LAMINAR MIXING<br>LAYERS<br>%<br>MIXING<br>MIXING LENGTH FLOW THEORY<br>SHEAR LAYERS<br>TURBULENT BOUNDARY LAYER<br>TURBULENT MIXING<br>TWO FLUID MODELS<br><br>MIXING LENGTH FLOW THEORY<br>1202 1203<br>GS<br>FLOW THEORY<br>#MIXING LENGTH FLOW THEORY<br>KINETIC THEORY<br>.TRANSPORT THEORY<br>.#MIXING LENGTH FLOW THEORY<br>MIXING LAYERS (FLUIDS)<br>SHEAR FLOW<br>%<br>THEORIES<br>TURBULENCE MODELS<br>TURBULENT FLOW<br>TURBULENT MIXING<br>VORTICITY TRANSPORT HYPOTHESIS | ..BINARY FLUIDS<br>..EUTECTICS<br>..EUTECTIC ALLOYS<br>..DISPERSIONS<br>..COLLOIDS<br>..AEROSOLS<br>....FOG<br>...COLLOIDAL PROPELLANTS<br>..EMULSIONS<br>...PHOTOGRAPHIC EMULSIONS<br>...NUCLEAR EMULSIONS<br>..LIQUID-GAS MIXTURES<br>...AEROSOLS<br>....FOG<br>..PLASTISOLS<br>...SMOKE<br>..POLYMER BLENDS<br>..SIALON<br>..SLURRIES<br>..SOLID SUSPENSIONS<br>..SOLUTIONS<br>..AQUEOUS SOLUTIONS<br>..GAS MIXTURES<br>...AIR<br>....ALVEOLAR AIR<br>....COMPRESSED AIR<br>....EXPIRED AIR<br>....HIGH TEMPERATURE AIR<br>....LIQUID AIR<br>...DETONABLE GAS MIXTURES<br>...PHOTOGRAPHIC EMULSIONS<br>...NUCLEAR EMULSIONS<br>..SOLID SOLUTIONS<br>..ALLOYS<br>RT<br>AZEOTROPES<br>%<br>COMBINATION<br>COMPOSITE MATERIALS<br>COMPOSITION (PROPERTY)<br>DISSOLVED GASES<br>EUTECTIC COMPOSITES<br>FORMULATIONS<br>INGREDIENTS<br>MIXERS<br>MIXING<br>PASTE (CONSISTENCY)<br>SOLUBILITY<br><br>ML-1 NUCLEAR POWER PLANT<br>2202 2204<br>GS<br>ELECTRIC POWER PLANTS<br>.NUCLEAR POWER PLANTS<br>.#ML-1 NUCLEAR POWER PLANT<br>NUCLEAR ELECTRIC POWER GENERATION<br>.NUCLEAR POWER PLANTS<br>.#ML-1 NUCLEAR POWER PLANT |
| MIXING CIRCUITS<br>1001<br>GS     | CIRCUITS<br>#MIXING CIRCUITS<br>FREQUENCY CONVERTERS<br>FREQUENCY SYNTHESIZERS<br>HETERODYNING<br>PREAMPLIFIERS                                                                                                                                                                                                                                                                                                                                                                                     | MIXING RATIOS<br>1202 1203 2003<br>GS<br>RATIOS<br>.DIMENSIONLESS NUMBERS<br>.#MIXING RATIOS<br>.MASS RATIOS<br>.#MIXING RATIOS<br>RT<br>ATMOSPHERIC COMPOSITION<br>ATMOSPHERIC MOISTURE<br>GAS MIXTURES<br>GASEOUS DIFFUSION<br>HUMIDITY<br>MIXING<br>MOISTURE CONTENT<br>WATER VAPOR                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| MIXING DEPTH<br>USE MIXING HEIGHT | DEPTH<br>MIXING HEIGHT                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1301<br>UF<br>RT                  | MIXING DEPTH<br>AIR POLLUTION<br>ATMOSPHERIC CIRCULATION<br>CONVECTION<br>CURRENTS<br>VERTICAL AIR CURRENTS<br>WIND (METEOROLOGY)<br>ZONAL FLOW (METEOROLOGY)                                                                                                                                                                                                                                                                                                                                       | MIXTURES<br>0603 1701 1704 1805 2701 2702<br>UF<br>BLENDS<br>GS<br>#MIXTURES<br>.ADMIXTURES<br>.BINARY MIXTURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|                              |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | RT % POWER PLANTS                                                                                                                                        | SN (EXCLUDES CONSIDERATIONS OF MANNED AND UNMANNED CRAFT)                                                                                                                                                                                            | FAILURE MODES<br>MEAN<br>MEDIAN (STATISTICS)<br>% MODE<br>MODES<br>MOMENTS<br>QUALITY CONTROL                                                                                                                                                                                                                                                                                         |
| MLA                          | USE MULTISPECTRAL LINEAR ARRAYS                                                                                                                          | GS #MOBILITY<br>.ATOMIC MOBILITIES<br>.CARRIER MOBILITY<br>..ELECTRON MOBILITY<br>..HOLE MOBILITY<br>.IONIC MOBILITY<br>RT % CONDUCTIVITY<br>DIFUSIVITY<br>DRIFT RATE<br>HALL EFFECT<br>KINETIC THEORY<br>PORTABLE EQUIPMENT<br>TRANSPORT PROPERTIES | MODE COUPLING<br>USE COUPLED MODES<br><br>MODE OF VIBRATION<br>USE VIBRATION MODE<br><br>MODE SHAPES<br>USE MODAL RESPONSE                                                                                                                                                                                                                                                            |
| MMS                          | USE MULTIMISSION MODULAR SPACECRAFT                                                                                                                      |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| MNEMONICS                    |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| O408                         | O410 O502 O503                                                                                                                                           |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| RT                           | MEMORY<br>NOMENCLATURES<br>SYMBOLIC PROGRAMMING<br>SYMBOLS                                                                                               |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| MNDS                         |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| USE                          | METAL-NITRIDE-OXIDE-SILICON                                                                                                                              | MOCVD (VAPOR DEPOSITION)<br>USE METALORGANIC CHEMICAL VAPOR DEPOSITION                                                                                                                                                                               | MODE TRANSFORMERS<br>O904 2304<br>GS TRANSducers<br>#MODE TRANSFORMERS<br>TRANSFORMERS<br>#MODE TRANSFORMERS<br>RT IMPEDANCE MATCHING<br>PROPAGATION MODES<br>TRANSMISSION LINES<br>VIBRATION MODE<br>WAVEGUIDE TUNERS                                                                                                                                                                |
| MOBILE COMMUNICATION SYSTEMS |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| O702                         |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| GS                           | #MOBILE COMMUNICATION SYSTEMS<br>.LAND MOBILE SATELLITE SERVICE<br>COMMUNICATION SATELLITES<br>MSAT<br>RADIO COMMUNICATION                               | MODAL RESPONSE<br>O101 1001 1202 2308 2311 3203<br>UF MODE SHAPES<br>GS RESPONSES<br>#MODAL RESPONSE<br>RT DYNAMIC RESPONSE<br>STROKING TESTS                                                                                                        | MODEL REFERENCE ADAPTIVE CONTROL<br>O804 1003<br>UF MRAC (SYSTEMS)<br>GS AUTOMATIC CONTROL<br>.ADAPTIVE CONTROL<br>.#MODEL REFERENCE ADAPTIVE CONTROL<br>RT AUTOMATA THEORY<br>AUTONOMY<br>% CONTROL<br>CONTROL THEORY<br>CYBERNETICS<br>DYNAMIC CONTROL<br>FEEDBACK CONTROL<br>FEEDFORWARD CONTROL<br>MATHEMATICAL MODELS<br>OPTIMAL CONTROL<br>SELF ALIGNMENT<br>SYSTEMS SIMULATION |
| MOBILE LOUNGES               |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| O506                         | 1101 1102 1104                                                                                                                                           |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| RT                           | AIRFIELD SURFACE MOVEMENTS<br>AIRPORTS<br>GROUND HANDLING<br>% LOUNGES                                                                                   | MODCOMP II COMPUTER<br>O801<br>GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>..DIGITAL COMPUTERS<br>..#MODCOMP II COMPUTER                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |
| MOBILE MISSILE LAUNCHERS     |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| 1104 3102                    |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| GS                           | LAUNCHERS<br>.MISSILE LAUNCHERS<br>.#MOBILE MISSILE LAUNCHERS<br>RT BALLISTIC MISSILE SUBMARINES<br>MISSILE STORAGE<br>MISSILE SYSTEMS<br>WEAPON SYSTEMS | MODCOMP IV COMPUTER<br>O801<br>GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>..DIGITAL COMPUTERS<br>..#MODCOMP IV COMPUTER                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |
| MOBILE QUARANTINE FACILITY   |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| 1102                         |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| RT                           | AEROSPACE MEDICINE<br>EVACUATING (TRANSPORTATION)<br>FACILITIES<br>MEDICAL EQUIPMENT<br>MEDICAL SERVICES<br>PHYSICAL EXAMINATIONS<br>PHYSIOLOGICAL TESTS | % MODE<br>O710 1808 1905<br>SN (USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW)<br>RT FAILURE MODES<br>MODE (STATISTICS)<br>MODES                                                                                        | MODELS<br>O804 1106 1107 1108 1902<br>GS #MODELS<br>.AIRCRAFT MODELS<br>.ASTRONOMICAL MODELS<br>..DENSITY WAVE MODEL<br>..STELLAR MODELS                                                                                                                                                                                                                                              |
| MOBILITY                     |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
| 2502 2602                    |                                                                                                                                                          |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |





# NASA THESAURUS HIERARCHICAL UPDATE

|                                      |  |  |  |
|--------------------------------------|--|--|--|
| SYSTEMS ENGINEERING                  |  |  |  |
| MODULATED CONTINUOUS RADIATION       |  |  |  |
| 0705 0710 1002 1404 1601             |  |  |  |
| GS                                   |  |  |  |
| CONTINUOUS RADIATION                 |  |  |  |
| #MODULATED CONTINUOUS RADIATION      |  |  |  |
| ELECTROMAGNETIC RADIATION            |  |  |  |
| #MODULATED CONTINUOUS RADIATION      |  |  |  |
| COHERENT ELECTROMAGNETIC RADIATION   |  |  |  |
| PHASE DEVIATION                      |  |  |  |
| % RADIATION                          |  |  |  |
| RT                                   |  |  |  |
| MODULATING RETRODIRECTIVE OPTICS     |  |  |  |
| USE MIROS SYSTEM                     |  |  |  |
| MODULATION                           |  |  |  |
| 0702 0710 1001 1002 1902             |  |  |  |
| UF                                   |  |  |  |
| CARRIER MODULATION                   |  |  |  |
| GS                                   |  |  |  |
| #MODULATION                          |  |  |  |
| ..AMPLITUDE MODULATION               |  |  |  |
| ..QUADRATURE AMPLITUDE MODULATION    |  |  |  |
| ..FREQUENCY MODULATION               |  |  |  |
| ..FEEDBACK FREQUENCY MODULATION      |  |  |  |
| ..FM/PM (MODULATION)                 |  |  |  |
| ..FREQUENCY SHIFT KEYING             |  |  |  |
| ..PULSE FREQUENCY MODULATION         |  |  |  |
| ..INTERMODULATION                    |  |  |  |
| ..IONOSPHERIC CROSS MODULATION       |  |  |  |
| ..LIGHT MODULATION                   |  |  |  |
| ..MIROS SYSTEM                       |  |  |  |
| ..ULTRASONIC LIGHT MODULATION        |  |  |  |
| ..PHASE MODULATION                   |  |  |  |
| ..FM/PM (MODULATION)                 |  |  |  |
| ..PHASE SHIFT KEYING                 |  |  |  |
| ..BINARY PHASE SHIFT KEYING          |  |  |  |
| ..QUADRATURE PHASE SHIFT KEYING      |  |  |  |
| ..PULSE MODULATION                   |  |  |  |
| ..PULSE AMPLITUDE MODULATION         |  |  |  |
| ..PULSE CODE MODULATION              |  |  |  |
| ..DELTA MODULATION                   |  |  |  |
| ..DIFFERENTIAL PULSE CODE MODULATION |  |  |  |
| ..PULSE FREQUENCY MODULATION         |  |  |  |
| ..PULSE TIME MODULATION              |  |  |  |
| ..PULSE DURATION MODULATION          |  |  |  |
| ..PULSE POSITION MODULATION          |  |  |  |
| ..TRAVELING WAVE MODULATION          |  |  |  |
| ..VELOCITY MODULATION                |  |  |  |
| RT                                   |  |  |  |
| CARRIER FREQUENCIES                  |  |  |  |
| CARRIER WAVES                        |  |  |  |
| COMPANDING                           |  |  |  |
| CRYSTALLIZATION                      |  |  |  |
| DEMODULATION                         |  |  |  |
| DEMODULATORS                         |  |  |  |
| DOUBLE SIDEBAND TRANSMISSION         |  |  |  |
| DYNAMIC RANGE                        |  |  |  |
| INTERFERENCE FACTOR TABLE            |  |  |  |
| MODULATORS                           |  |  |  |
| P.A.C.M. TELEMETRY                   |  |  |  |
| PULSE FREQUENCY MODULATION           |  |  |  |
| TELEMETRY                            |  |  |  |
| RADIO TRANSMISSION                   |  |  |  |
| REMODULATION                         |  |  |  |
| SELECTIVE FADING                     |  |  |  |
| TELECOMMUNICATION                    |  |  |  |
| WAVE INTERACTION                     |  |  |  |
| MODULATION DOPED FETS                |  |  |  |
| USE MODFETS                          |  |  |  |
| MODULATION DOPING                    |  |  |  |
| 0903 0906 3407                       |  |  |  |
| RT                                   |  |  |  |
| ADDITIVES                            |  |  |  |
| DONOR MATERIALS                      |  |  |  |
| DOPED CRYSTALS                       |  |  |  |
| ELECTRON MOBILITY                    |  |  |  |
| ENERGY GAPS (SOLID STATE)            |  |  |  |
| HETEROJUNCTION DEVICES               |  |  |  |
| HETEROJUNCTIONS                      |  |  |  |
| HIGH ELECTRON MOBILITY TRANSISTORS   |  |  |  |
| ION IMPLANTATION                     |  |  |  |
| SEMICONDUCTOR DEVICES                |  |  |  |
| SEMICONDUCTORS (MATERIALS)           |  |  |  |
| MODULATION TRANSFER FUNCTION         |  |  |  |
| 0710 1003 1902 2306 2310             |  |  |  |
| UF                                   |  |  |  |
| MTF                                  |  |  |  |
| GS                                   |  |  |  |
| FUNCTIONS (MATHEMATICS)              |  |  |  |
| ..TRANSFER FUNCTIONS                 |  |  |  |
| ..#MODULATION TRANSFER FUNCTION      |  |  |  |
| RT                                   |  |  |  |
| FIGURE OF MERIT                      |  |  |  |
| IMAGING TECHNIQUES                   |  |  |  |
| OPTICAL MEASUREMENT                  |  |  |  |
| OPTICAL TRANSFER FUNCTION            |  |  |  |
| % PERFORMANCE                        |  |  |  |
| SYSTEM EFFECTIVENESS                 |  |  |  |
| SYSTEMS ANALYSIS                     |  |  |  |
| MODULATORS                           |  |  |  |
| 0702 0902 0904 1601                  |  |  |  |
| GS                                   |  |  |  |
| #MODULATORS                          |  |  |  |
| ..BRAGG CELLS                        |  |  |  |
| ..MODEMS                             |  |  |  |
| RT                                   |  |  |  |
| AMPLIFIERS                           |  |  |  |
| AMPLITUDE MODULATION                 |  |  |  |
| DEMODULATORS                         |  |  |  |
| ELECTRON TUBES                       |  |  |  |
| FREQUENCY MODULATION                 |  |  |  |
| LIGHT MODULATION                     |  |  |  |
| MATCHED FILTERS                      |  |  |  |
| MODULATED CONTINUOUS RADIATION       |  |  |  |
| 0705 0710 1002 1404 1601             |  |  |  |
| GS                                   |  |  |  |
| CONTINUOUS RADIATION                 |  |  |  |
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| ELECTROMAGNETIC RADIATION            |  |  |  |
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| COHERENT ELECTROMAGNETIC RADIATION   |  |  |  |
| PHASE DEVIATION                      |  |  |  |
| % RADIATION                          |  |  |  |
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| MODULATING RETRODIRECTIVE OPTICS     |  |  |  |
| USE MIROS SYSTEM                     |  |  |  |
| MODULATION                           |  |  |  |
| 0702 0710 1001 1002 1902             |  |  |  |
| UF                                   |  |  |  |
| CARRIER MODULATION                   |  |  |  |
| GS                                   |  |  |  |
| #MODULATION                          |  |  |  |
| ..AMPLITUDE MODULATION               |  |  |  |
| ..QUADRATURE AMPLITUDE MODULATION    |  |  |  |
| ..FREQUENCY MODULATION               |  |  |  |
| ..FEEDBACK FREQUENCY MODULATION      |  |  |  |
| ..FM/PM (MODULATION)                 |  |  |  |
| ..FREQUENCY SHIFT KEYING             |  |  |  |
| ..PULSE FREQUENCY MODULATION         |  |  |  |
| ..INTERMODULATION                    |  |  |  |
| ..IONOSPHERIC CROSS MODULATION       |  |  |  |
| ..LIGHT MODULATION                   |  |  |  |
| ..MIROS SYSTEM                       |  |  |  |
| ..ULTRASONIC LIGHT MODULATION        |  |  |  |
| ..PHASE MODULATION                   |  |  |  |
| ..FM/PM (MODULATION)                 |  |  |  |
| ..PHASE SHIFT KEYING                 |  |  |  |
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| ..PULSE MODULATION                   |  |  |  |
| ..PULSE AMPLITUDE MODULATION         |  |  |  |
| ..PULSE CODE MODULATION              |  |  |  |
| ..DELTA MODULATION                   |  |  |  |
| ..DIFFERENTIAL PULSE CODE MODULATION |  |  |  |
| ..PULSE FREQUENCY MODULATION         |  |  |  |
| ..PULSE TIME MODULATION              |  |  |  |
| ..PULSE DURATION MODULATION          |  |  |  |
| ..PULSE POSITION MODULATION          |  |  |  |
| ..TRAVELING WAVE MODULATION          |  |  |  |
| ..VELOCITY MODULATION                |  |  |  |
| RT                                   |  |  |  |
| CARRIER FREQUENCIES                  |  |  |  |
| CARRIER WAVES                        |  |  |  |
| COMPANDING                           |  |  |  |
| CRYSTALLIZATION                      |  |  |  |
| DEMODULATION                         |  |  |  |
| DEMODULATORS                         |  |  |  |
| DOUBLE SIDEBAND TRANSMISSION         |  |  |  |
| MODULATED CONTINUOUS RADIATION       |  |  |  |
| 0705 0710 1002 1404 1601             |  |  |  |
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| MODULATING RETRODIRECTIVE OPTICS     |  |  |  |
| USE MIROS SYSTEM                     |  |  |  |
| MODULATION                           |  |  |  |
| 0702 0710 1001 1002 1902             |  |  |  |
| UF                                   |  |  |  |
| CARRIER MODULATION                   |  |  |  |
| GS                                   |  |  |  |
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| ..AMPLITUDE MODULATION               |  |  |  |
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| ..VELOCITY MODULATION                |  |  |  |
| RT                                   |  |  |  |
| CARRIER FREQUENCIES                  |  |  |  |
| CARRIER WAVES                        |  |  |  |
| COMPANDING                           |  |  |  |
| CRYSTALLIZATION                      |  |  |  |
| DEMODULATION                         |  |  |  |
| DEMODULATORS                         |  |  |  |
| DOUBLE SIDEBAND TRANSMISSION         |  |  |  |
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| ..VELOCITY MODULATION                |  |  |  |
| RT                                   |  |  |  |
| CARRIER FREQUENCIES                  |  |  |  |
| CARRIER WAVES                        |  |  |  |
| COMPANDING                           |  |  |  |
| CRYSTALLIZATION                      |  |  |  |
| DEMODULATION                         |  |  |  |
| DEMODULATORS                         |  |  |  |
| DOUBLE SIDEBAND TRANSMISSION         |  |  |  |
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| 0705 0710 1002 1404 1601             |  |  |  |
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| 0702 0710 1001 1002 1902             |  |  |  |
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| CARRIER FREQUENCIES                  |  |  |  |
| CARRIER WAVES                        |  |  |  |
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| CRYSTALLIZATION                      |  |  |  |
| DEMODULATION                         |  |  |  |
| DEMODULATORS                         |  |  |  |
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| COHERENT ELECTROMAGNETIC RADIATION   |  |  |  |
| PH                                   |  |  |  |

MOHAWK AIRCRAFT  
 USE OV-1 AIRCRAFT  
 MOHR CIRCLES  
 USE FRACTURE MECHANICS  
 MOIRE EFFECTS  
 2306 2310 2601  
 RT BEAT FREQUENCIES  
 BIREFRINGENCE  
 DIFFRACTION  
 % EFFECTS  
 FRINGE MULTIPLICATION  
 INTERFERENCE GRATING  
 % METHODOLOGY  
 MOIRE FRINGES  
 MOIRE INTERFEROMETRY  
 PHOTOELASTIC ANALYSIS  
 SCHLIEREN PHOTOGRAPHY  
 MOIRE FRINGES  
 2306  
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 FRINGE MULTIPLICATION  
 INTERFERENCE GRATING  
 MOIRE EFFECTS  
 STRESS ANALYSIS  
 STRESS CONCENTRATION  
 MOIRE INTERFEROMETRY  
 1405  
 GS INTERFEROMETRY  
 #MOIRE INTERFEROMETRY  
 RT DIFFRACTION PATTERNS  
 HOLOGRAPHIC INTERFEROMETRY  
 MOIRE EFFECTS  
 MOISTURE  
 O603 2001 2003  
 GS #MOISTURE  
 .ATMOSPHERIC MOISTURE  
 .SOIL MOISTURE  
 RT HUMIDITY  
 HYGRAL PROPERTIES  
 METEOROLOGICAL PARAMETERS  
 METEOROLOGY  
 WATER  
 WATER VAPOR  
 MOISTURE CONTENT  
 O603 2001 2003 3404  
 UF DAMPNES  
 WATER CONTENT  
 WETNESS  
 GS COMPOSITION (PROPERTY)  
 .CONCENTRATION (COMPOSITION)  
 .#MOISTURE CONTENT  
 ...ATMOSPHERIC MOISTURE  
 RT ATMOSPHERIC COMPOSITION  
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 LYSIMETERS  
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 WATER  
 WATER VAPOR  
 MOISTURE DETECTORS  
 USE MOISTURE METERS  
 MOISTURE METERS  
 O603 1406 2001 2002 2003  
 UF MOISTURE DETECTORS  
 GS MEASURING INSTRUMENTS  
 #MOISTURE METERS  
 ...HYGROMETERS  
 ...PSYCHROMETERS  
 RT CHEMICAL ANALYSIS  
 HUMIDITY  
 HUMIDITY MEASUREMENT  
 MOISTURE RESISTANCE  
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 COATINGS  
 HYDROTHERMAL STRESS ANALYSIS  
 HYGROSCOPICITY  
 POROSITY  
 % RESISTANCE  
 SEALING  
 WATERPROOFING  
 WEATHERPROOFING  
 MOJAVE DESERT (CA)  
 1305  
 GS LAND  
 .DESERTS  
 .#MOJAVE DESERT (CA)  
 RT ARID LANDS  
 CALIFORNIA  
 DESERTIFICATION  
 REMOTE REGIONS  
 MOL (ORBITAL LABORATORIES)  
 USE MANNED ORBITAL LABORATORIES  
 MOLABS  
 USE LUNAR MOBILE LABORATORIES  
 .CONCENTRATION (COMPOSITION)  
 1504  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ASPERGILLUS  
 FUNGI  
 MOLDS  
 RHIZOPUS  
 RUST FUNGI  
 MOLDAVIA  
 1305  
 GS NATIONS  
 #MOLDAVIA  
 RT EUROPE  
 MOLDAVITE  
 1704 1806 3001  
 GS ROCKS  
 .IGNEOUS ROCKS  
 .OBSIDIAN  
 .#MOLDAVITE  
 GLASS  
 RT METEORITES  
 SOILS  
 MOLDING MATERIALS  
 1704 3404  
 GS #MOLDING MATERIALS  
 .SHEET MOLDING COMPOUNDS  
 RT BINDERS (MATERIALS)  
 CASTING  
 CLAYS  
 CORES  
 INJECTION MOLDING  
 % MATERIALS  
 MOLDS  
 PLASTERS  
 PLASTICS  
 RESIN TRANSFER MOLDING  
 SAND CASTING  
 SANDS  
 TENITE  
 MOLDS  
 1504  
 SN (EXCLUDES ORGANISMS)  
 RT CASTING  
 CASTINGS  
 DIES  
 FLAT PATTERNS  
 FOUNDRIES  
 INGOTS

# NASA THESAURUS HIERARCHICAL UPDATE

|                                |  |  |  |
|--------------------------------|--|--|--|
| INJECTION MOLDING              |  |  |  |
| MANDRELS                       |  |  |  |
| MELTING                        |  |  |  |
| % MOLD                         |  |  |  |
| MOLDING MATERIALS              |  |  |  |
| ORGANIC MATERIALS              |  |  |  |
| % PATTERNS                     |  |  |  |
| PREFORMS                       |  |  |  |
| PRESSING (FORMING)             |  |  |  |
| PUNCHES                        |  |  |  |
| RESIN TRANSFER MOLDING         |  |  |  |
| SHEET MOLDING COMPOUNDS        |  |  |  |
| TABLETS                        |  |  |  |
| TEMPLATES                      |  |  |  |
| MOLECULAR ABSORPTION           |  |  |  |
| 0602 0603 1203 2404            |  |  |  |
| GS ENERGY ABSORPTION           |  |  |  |
| .RADIATION ABSORPTION          |  |  |  |
| .#MOLECULAR ABSORPTION         |  |  |  |
| RT % ABSORPTION                |  |  |  |
| ATMOSPHERIC ATTENUATION        |  |  |  |
| BEER LAW                       |  |  |  |
| ELECTROMAGNETIC ABSORPTION     |  |  |  |
| LIGHT TRANSMISSION             |  |  |  |
| MOLECULAR BEAM EPITAXY         |  |  |  |
| 2601                           |  |  |  |
| GS GROWTH                      |  |  |  |
| .CRYSTAL GROWTH                |  |  |  |
| ..EPITAXY                      |  |  |  |
| ..#MOLECULAR BEAM EPITAXY      |  |  |  |
| MOLECULAR BEAMS                |  |  |  |
| 0603 1203 2404 2502            |  |  |  |
| GS BEAMS (RADIATION)           |  |  |  |
| .PARTICLE BEAMS                |  |  |  |
| ..NEUTRAL BEAMS                |  |  |  |
| ..#MOLECULAR BEAMS             |  |  |  |
| RT ATOMIC BEAMS                |  |  |  |
| ATOMIC CLOCKS                  |  |  |  |
| FREE MOLECULAR FLOW            |  |  |  |
| ION BEAMS                      |  |  |  |
| MOLECULES                      |  |  |  |
| RAREFIED GAS DYNAMICS          |  |  |  |
| MOLECULAR BIOLOGY              |  |  |  |
| 0403 0404                      |  |  |  |
| GS LIFE SCIENCES               |  |  |  |
| #MOLECULAR BIOLOGY             |  |  |  |
| RT BIOCHEMISTRY                |  |  |  |
| % BIOLOGY                      |  |  |  |
| EUKARYOTES                     |  |  |  |
| GENE EXPRESSION                |  |  |  |
| GENES                          |  |  |  |
| PHYSIOCHEMISTRY                |  |  |  |
| PROKARYOTES                    |  |  |  |
| MOLECULAR BONDS                |  |  |  |
| USE CHEMICAL BONDS             |  |  |  |
| MOLECULAR CHAINS               |  |  |  |
| 0603 1808 1809 2404            |  |  |  |
| RT % ALIPHATIC COMPOUNDS       |  |  |  |
| CHAINS                         |  |  |  |
| CRYSTAL LATTICES               |  |  |  |
| MACROMOLECULES                 |  |  |  |
| MONOMERS                       |  |  |  |
| MOLECULAR CLOUDS               |  |  |  |
| 2003 3009                      |  |  |  |
| RT ASTRONOMICAL MODELS         |  |  |  |
| % CLOUDS                       |  |  |  |
| COSMIC DUST                    |  |  |  |
| GALACTIC HALOS                 |  |  |  |
| HYDROGEN CLOUDS                |  |  |  |
| INFRARED CIRRU (ASTRONOMY)     |  |  |  |
| INTERSTELLAR CHEMISTRY         |  |  |  |
| INTERSTELLAR GAS               |  |  |  |
| INTERSTELLAR MASERS            |  |  |  |
| INTERSTELLAR MATTER            |  |  |  |
| METHYLIDYNE                    |  |  |  |
| STAR FORMATION                 |  |  |  |
| MOLECULAR CLUSTERS             |  |  |  |
| 0602 1802 1804 2404            |  |  |  |
| RT AGGLOMERATION               |  |  |  |
| ATOMIC CLUSTERS                |  |  |  |
| CHEMISORPTION                  |  |  |  |
| CLUMPS                         |  |  |  |
| % CLUSTERS                     |  |  |  |
| FULLERENES                     |  |  |  |
| METAL CLUSTERS                 |  |  |  |
| NUCLEATION                     |  |  |  |
| MOLECULAR COLLISIONS           |  |  |  |
| 0603 1203 2404 3501            |  |  |  |
| GS COLLISIONS                  |  |  |  |
| #MOLECULAR COLLISIONS          |  |  |  |
| PARTICLE INTERACTIONS          |  |  |  |
| .MOLECULAR INTERACTIONS        |  |  |  |
| .#MOLECULAR COLLISIONS         |  |  |  |
| RT ATOMIC COLLISIONS           |  |  |  |
| BKG MODEL                      |  |  |  |
| % INTERACTIONS                 |  |  |  |
| PARTICLE COLLISIONS            |  |  |  |
| RIGID ROTORS (PLASMA PHYSICS)  |  |  |  |
| MOLECULAR DIFFUSION            |  |  |  |
| 0406 0602 1203 2404 3501       |  |  |  |
| GS DIFFUSION                   |  |  |  |
| #MOLECULAR DIFFUSION           |  |  |  |
| ATMOSPHERIC DIFFUSION          |  |  |  |
| DIFFUSION COEFFICIENT          |  |  |  |
| DIFFUSION WAVES                |  |  |  |
| DISSOCIATION                   |  |  |  |
| GASEOUS DIFFUSION              |  |  |  |
| GASEOUS SELF-DIFFUSION         |  |  |  |
| PARTICLE DIFFUSION             |  |  |  |
| SELF DIFFUSION (SOLID STATE)   |  |  |  |
| SURFACE DIFFUSION              |  |  |  |
| MOLECULAR DISSOCIATION         |  |  |  |
| USE DISSOCIATION               |  |  |  |
| MOLECULAR DYNAMICS             |  |  |  |
| 0602 2404                      |  |  |  |
| RT COMPUTERIZED SIMULATION     |  |  |  |
| CRYSTAL STRUCTURE              |  |  |  |
| % DYNAMICS                     |  |  |  |
| MICROSTRUCTURE                 |  |  |  |
| MOLECULAR INTERACTIONS         |  |  |  |
| % MOLECULAR PHYSICS            |  |  |  |
| MOLECULAR TRAJECTORIES         |  |  |  |
| PHYSICAL CHEMISTRY             |  |  |  |
| STATISTICAL MECHANICS          |  |  |  |
| MOLECULAR ELECTRONICS          |  |  |  |
| 1002 1204                      |  |  |  |
| GS ELECTROPHYSICS              |  |  |  |
| #MOLECULAR ELECTRONICS         |  |  |  |
| RTL INTEGRATED CIRCUITS        |  |  |  |
| % ELECTRONICS                  |  |  |  |
| INTEGRATED CIRCUITS            |  |  |  |
| LANGMUIR-BLODGETT FILMS        |  |  |  |
| LARGE SCALE INTEGRATION        |  |  |  |
| LINEAR INTEGRATED CIRCUITS     |  |  |  |
| MEDIUM SCALE INTEGRATION       |  |  |  |
| MICROELECTRONICS               |  |  |  |
| MICROMINIATURIZATION           |  |  |  |
| MINIATURE ELECTRONIC EQUIPMENT |  |  |  |
| MONOMOLECULAR FILMS            |  |  |  |
| PI-ELECTRONS                   |  |  |  |
| SEMICONDUCTOR DEVICES          |  |  |  |
| THIN FILMS                     |  |  |  |
| TTL INTEGRATED CIRCUITS        |  |  |  |
| VERY LARGE SCALE INTEGRATION   |  |  |  |
| MOLECULAR ENERGY LEVELS        |  |  |  |
| 2311 2404 3304                 |  |  |  |
| GS LEVEL (QUANTITY)            |  |  |  |
| .ENERGY LEVELS                 |  |  |  |
| .#MOLECULAR ENERGY LEVELS      |  |  |  |
| ...INTERMOLECULAR FORCES       |  |  |  |
| ...ROTATIONAL STATES           |  |  |  |



[illegible]

## U.S.S.R. SPACE PROGRAM

MOLTEN SALT ELECTROLYTES  
O603 1504 1804 2302 2304  
GS CONDUCTORS

.ELECTROLYTES  
.#MOLTEN SALT ELECTROLYTES

## MOLTEN SALT NUCLEAR REACTORS

2203 2204  
UF MSRE REACTORS  
GS NUCLEAR REACTORS  
RT #MOLTEN SALT NUCLEAR REACTORS  
RT % REACTORS

## MOLTEN SALTS

2601  
RT HALIDES  
HALITES  
INORGANIC COMPOUNDS  
NITRIDES  
SALT BATHS  
% SALTS  
SODIUM CHLORIDES

## MOLTING

O404  
RT PHENOLOGY  
SHEDDING

## MOLYBDATES

O603 1804  
GS MOLYBDENUM COMPOUNDS  
#MOLYBDATES  
..LEAD MOLYBDATES

## MOLYBDENUM

1703  
GS CHEMICAL ELEMENTS  
#MOLYBDENUM  
METALS  
.REFRACTORY METALS  
.#MOLYBDENUM  
.TRANSITION METALS  
.#MOLYBDENUM  
REFRACTORY MATERIALS  
.REFRACTORY METALS  
.#MOLYBDENUM  
RT MOLYBDENUM ISOTOPES

## MOLYBDENUM ALLOYS

O603 1701 1704  
GS ALLOYS  
.HEAT RESISTANT ALLOYS  
..REFRACTORY METAL ALLOYS

## ..#MOLYBDENUM ALLOYS

....RENE 41  
....RENE 63  
....RENE 77  
REFRACTORY MATERIALS  
REFRACTORY METAL ALLOYS  
.#MOLYBDENUM ALLOYS  
....RENE 41  
....RENE 63  
....RENE 77  
RT HASTELLOY (TRADEMARK)  
MULBERRY (ALLOY)  
PERMALLOYS (TRADEMARK)  
STAINLESS STEELS

## MOLYBDENUM CARBIDES

O603  
GS CARBON COMPOUNDS  
.CARBIDES  
.#MOLYBDENUM CARBIDES

## MOLYBDENUM COMPOUNDS

O603 1804  
GS #MOLYBDENUM COMPOUNDS  
..MOLYBDATES  
..LEAD MOLYBDATES  
..MOLYBDENUM DISULFIDES  
..MOLYBDENUM OXIDES  
RT % CHEMICAL COMPOUNDS  
% GROUP 6B COMPOUNDS  
% METAL COMPOUNDS

## MOLYBDENUM DISULFIDES

1704 1804  
GS CHALCOGENIDES  
.SULFIDES  
..INORGANIC SULFIDES  
...MOLYBDENUM SULFIDES  
...#MOLYBDENUM DISULFIDES  
MOLYBDENUM COMPOUNDS  
#MOLYBDENUM DISULFIDES  
SULFUR COMPOUNDS  
.SULFIDES  
..INORGANIC SULFIDES  
...MOLYBDENUM SULFIDES  
...#MOLYBDENUM DISULFIDES

## MOLYBDENUM ISOTOPES

O603 2406  
GS CHEMICAL ELEMENTS  
.NUCLIDES  
..ISOTOPES  
...#MOLYBDENUM ISOTOPES  
RT MOLYBDENUM

## MOLYBDENUM OXIDES

O603 1804  
GS CHALCOGENIDES  
.OXIDES  
..METAL OXIDES  
..#MOLYBDENUM OXIDES  
MOLYBDENUM COMPOUNDS  
#MOLYBDENUM OXIDES

## MOLYBDENUM SULFIDES

O603 1804  
GS CHALCOGENIDES  
.SULFIDES  
..INORGANIC SULFIDES  
...MOLYBDENUM SULFIDES  
...MOLYBDENUM DISULFIDES  
SULFUR COMPOUNDS  
.SULFIDES  
..INORGANIC SULFIDES  
..#MOLYBDENUM SULFIDES  
....MOLYBDENUM DISULFIDES

## MOM (SEMICONDUCTORS)

O906  
UF METAL-OXIDE-METAL SEMICONDUCTORS  
GS SEMICONDUCTORS (MATERIALS)  
#MOM (SEMICONDUCTORS)  
RT ION IMPLANTATION

## MOMENT DISTRIBUTION

2308 2311 3203  
GS DISTRIBUTION (PROPERTY)  
#MOMENT DISTRIBUTION  
RT ANGULAR DISTRIBUTION  
FORCE DISTRIBUTION  
INFLUENCE COEFFICIENT  
LOADING MOMENTS  
LOADS (FORCES)  
MASS DISTRIBUTION  
METHOD OF MOMENTS  
MOMENTS  
MOMENTS OF INERTIA  
PRESSURE DISTRIBUTION  
STATIC LOADS  
STRESS CONCENTRATION  
STRUCTURAL ANALYSIS  
STRUCTURAL DESIGN CRITERIA

## MOMENTS

O101 O603 2308 2311  
GS #MOMENTS  
.BENDING MOMENTS  
.DIPOLE MOMENTS  
..ELECTRIC MOMENTS  
..MAGNETIC MOMENTS

# NASA THESAURUS HIERARCHICAL UPDATE

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.DISTRIBUTION MOMENTS
..MEAN
..ORTHOGONALITY
..STANDARD DEVIATION
..LOADING MOMENTS
..MOMENTS OF INERTIA
..STABILITY DERIVATIVES
..PITCHING MOMENTS
..ROLLING MOMENTS
..YAWING MOMENTS
.TORQUE
METHOD OF MOMENTS
MODE (STATISTICS)
MOMENT DISTRIBUTION
MOMENTUM
SKEWNESS
TORSION
VARIANCE (STATISTICS)

RT
2308 2311
UF INERTIA MOMENTS
GS MOMENTS
#MOMENTS OF INERTIA
RT ANGULAR MOMENTUM
CENTER OF GRAVITY
CENTER OF PRESSURE
CENTROIDS
EQUATIONS OF MOTION
EULER EQUATIONS OF MOTION
INERTIA
INERTIA PRINCIPLE
MACH INERTIA PRINCIPLE
MASS
MASS DISTRIBUTION
MOMENT DISTRIBUTION
PITCHING MOMENTS
ROLLING MOMENTS
STABILITY DERIVATIVES
STRESS ANALYSIS
STRUCTURAL STRAIN
TORQUE
YAWING MOMENTS

MOMENTUM
2308 2311
GS #MOMENTUM
RT .ANGULAR MOMENTUM
CLASSICAL MECHANICS
DE BROGLIE WAVELENGTHS
% DYNAMICS
MOMENTS
% MOTION
MOTION AFTEREFFECTS
PENDULUMS

TURNING FLIGHT
MOMENTUM ENERGY
USE KINETIC ENERGY
MOMENTUM THEORY
2308 2311
RT CONSERVATION LAWS
NEWTON SECOND LAW
% THEORIES
MOMENTUM TRANSFER
2308 2311 3201
RT % DYNAMICS
ENERGY TRANSFER
GAS-LIQUID INTERACTIONS
HYDRODYNAMIC RAM EFFECT
KINETIC THEORY
KINETICS
PRANDTL NUMBER
TRANSFERRING

MONACO
1305
GS NATIONS
#MONACO
RT EUROPE

MONATOMIC GASES
O603 1203 3501
UF ATOMIC GASES
GS GASES
#MONATOMIC GASES
RT CHAPMAN-ENSKOG THEORY
MOLECULAR GASES
RARE GASES
REAL GASES

MONATOMIC MOLECULES
O603 2311 2401 2404
GS MOLECULES
#MONATOMIC MOLECULES
RT ATOMS
CHEMICAL BONDS
% CHEMICAL COMPOUNDS
IONS
LOW MOLECULAR WEIGHTS
% MOLECULAR PHYSICS
MOLECULAR STRUCTURE
MOLECULAR WEIGHT
POSITIVE IONS

MONAURAL SIGNALS
O202 0405 0701 0705 1406
RT AUDIO EQUIPMENT

AUDIO FREQUENCIES
AUDITORY PERCEPTION
AUDITORY SIGNALS
LOUDSPEAKERS
MICROPHONES
SOUND TRANSMISSION

MONAZITE SANDS
1802 2203 2406
GS PHOSPHORUS COMPOUNDS
.PHOSPHATES
.#MONAZITE SANDS
SEDIMENTS
.SANDS
.#MONAZITE SANDS
SOILS
.SANDS
.#MONAZITE SANDS
MINERALS
RT SEDIMENTARY ROCKS

MONEL (TRADEMARK)
O603 1701 1704
GS ALLOYS
.NICKEL ALLOYS
.#MONEL (TRADEMARK)

MONGE-AMPERE EQUATION
O902 1902 2302 2304 2402
GS ALGEBRA
.NONLINEAR EQUATIONS
.#MONGE-AMPERE EQUATION
ANALYSIS (MATHEMATICS)
.REAL VARIABLES
..DIFFERENTIAL EQUATIONS
...PARTIAL DIFFERENTIAL EQUATIONS
...ELLIPTIC DIFFERENTIAL EQUATIONS
...#MONGE-AMPERE EQUATION
..NONLINEAR EQUATIONS
..#MONGE-AMPERE EQUATION
RT BOUNDARY VALUE PROBLEMS
% EQUATIONS

MONGOLIA
1305
GS NATIONS
#MONGOLIA
RT ASIA

MONITORS
O708 1406 1408 1409 1410 3501
RT AIRCRAFT INSTRUMENTS
ALARM PROJECT
ANALYZERS
CONICAL SCANNING

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|                                     |                          |                                        |
|-------------------------------------|--------------------------|----------------------------------------|
| COUNTERS                            | RT                       | MONOCHROMATIC RADIATION                |
| DATA RECORDERS                      |                          | PARTICLE ENERGY                        |
| % DETECTORS                         |                          | POLARIZATION (WAVES)                   |
| DISPLAY DEVICES                     |                          |                                        |
| ENVIRONMENTAL MONITORING            |                          |                                        |
| GAS DETECTORS                       | 0708 1404 1411 2402 2903 |                                        |
| HELMET MOUNTED DISPLAYS             | GS                       | MEASURING INSTRUMENTS                  |
| IN-FLIGHT MONITORING                |                          | #MONOCHROMATORS                        |
| % INSTRUMENTS                       |                          | RADIATION SOURCES                      |
| % MEASUREMENT                       |                          | #MONOCHROMATORS                        |
| MEASURING INSTRUMENTS               |                          | COMPARATORS                            |
| OPTICAL SCANNERS                    | RT                       | DUCHROMATORS                           |
| POLLUTION MONITORING                |                          | GONIOMETERS                            |
| RADIATION MEASURING INSTRUMENTS     |                          | LIGHT SOURCES                          |
| SCANNING                            |                          | MONOCHROMATIC RADIATION                |
| WARNING                             |                          | OPTICAL EQUIPMENT                      |
| WARNING SYSTEMS                     |                          | PHOTOGRAPHIC MEASURING INSTRUMENTS     |
|                                     |                          | PHOTOGONIOMETERS                       |
|                                     |                          | SPECTROPHOTOMETERS                     |
| MONKEYS                             |                          |                                        |
| 0402 0404                           |                          |                                        |
| GS                                  |                          |                                        |
| . VERTEBRATES                       |                          |                                        |
| ..MAMMALS                           |                          |                                        |
| ...PRIMATES                         |                          |                                        |
| ....#MONKEYS                        |                          |                                        |
| MONOCHROMATIC RADIATION             |                          |                                        |
| 2306 2310 2402 2903                 |                          |                                        |
| SN                                  |                          | (LIMITED TO ELECTROMAGNETIC RADIATION) |
| GS                                  |                          | ELECTROMAGNETIC RADIATION              |
| #MONOCHROMATIC RADIATION            |                          |                                        |
| BEAMS (RADIATION)                   |                          |                                        |
| BREITLUNN EFFECT                    |                          |                                        |
| COHERENT ELECTROMAGNETIC RADIATION  |                          |                                        |
| COHERENT LIGHT                      |                          |                                        |
| % FILTERS                           |                          |                                        |
| GAMMA RAYS                          |                          |                                        |
| INFRARED RADIATION                  |                          |                                        |
| IONIZING RADIATION                  |                          |                                        |
| LIGHT (VISIBLE RADIATION)           |                          |                                        |
| LONG WAVE RADIATION                 |                          |                                        |
| MONOCHROMATIZATION                  |                          |                                        |
| MONOCHROMATORS                      |                          |                                        |
| POLARIZED ELECTROMAGNETIC RADIATION |                          |                                        |
| POLARIZED LIGHT                     |                          |                                        |
| % RADIATION                         |                          |                                        |
| RADIO WAVES                         |                          |                                        |
| SHORT WAVE RADIATION                |                          |                                        |
| ULTRAVIOLET RADIATION               |                          |                                        |
| X RAYS                              |                          |                                        |
| MONOCHROMATIZATION                  |                          |                                        |
| 2302 2306 2310 2403                 |                          |                                        |
| UF                                  |                          | INTERFERENCE MONOCHROMATIZATION        |
| COUNTERS                            | RT                       | MONOCHROMATIC RADIATION                |
| DATA RECORDERS                      |                          | PARTICLE ENERGY                        |
| % DETECTORS                         |                          | POLARIZATION (WAVES)                   |
| DISPLAY DEVICES                     |                          |                                        |
| ENVIRONMENTAL MONITORING            |                          |                                        |
| GAS DETECTORS                       | 0708 1404 1411 2402 2903 |                                        |
| HELMET MOUNTED DISPLAYS             | GS                       | MEASURING INSTRUMENTS                  |
| IN-FLIGHT MONITORING                |                          | #MONOCHROMATORS                        |
| % INSTRUMENTS                       |                          | RADIATION SOURCES                      |
| % MEASUREMENT                       |                          | #MONOCHROMATORS                        |
| MEASURING INSTRUMENTS               |                          | COMPARATORS                            |
| OPTICAL SCANNERS                    | RT                       | DUCHROMATORS                           |
| POLLUTION MONITORING                |                          | GONIOMETERS                            |
| RADIATION MEASURING INSTRUMENTS     |                          | LIGHT SOURCES                          |
| SCANNING                            |                          | MONOCHROMATIC RADIATION                |
| WARNING                             |                          | OPTICAL EQUIPMENT                      |
| WARNING SYSTEMS                     |                          | PHOTOGRAPHIC MEASURING INSTRUMENTS     |
|                                     |                          | PHOTOGONIOMETERS                       |
|                                     |                          | SPECTROPHOTOMETERS                     |
| MONOCOCOQUE STRUCTURES              |                          |                                        |
| 0102 0104 0202 3202 3203            |                          |                                        |
| RT % CYLINDERS                      |                          |                                        |
| SHELLS (STRUCTURAL FORMS)           |                          |                                        |
| STRESSED-SKIN STRUCTURES            |                          |                                        |
| % STRUCTURES                        |                          |                                        |
| MONOCRYSTALS                        |                          |                                        |
| USE SINGLE CRYSTALS                 |                          |                                        |
| MONOCULAR VISION                    |                          |                                        |
| 0404 0408 0506 2310                 |                          |                                        |
| GS                                  |                          | VISION                                 |
| #MONOCULAR VISION                   |                          |                                        |
| HUMAN FACTORS ENGINEERING           |                          |                                        |
| MOTION PERCEPTION                   |                          |                                        |
| PERCEPTION                          |                          |                                        |
| SPACE PERCEPTION                    |                          |                                        |
| MONOETHANOLAMINE (MEA)              |                          |                                        |
| 0603 1808                           |                          |                                        |
| GS                                  |                          | AMINES                                 |
| #MONOETHANOLAMINE (MEA)             |                          |                                        |
| MONOIDS                             |                          |                                        |
| 1902                                |                          |                                        |
| GS                                  |                          | ALGEBRA                                |
| GROUP THEORY                        |                          |                                        |
| ..HOMOMORPHISMS                     |                          |                                        |
| ..#MONOIDS                          |                          |                                        |
| MONOLITHIC CIRCUITS                 |                          |                                        |
| USE INTEGRATED CIRCUITS             |                          |                                        |
| MONOMERS                            |                          |                                        |
| MONOCHROMATIZATION                  |                          |                                        |
| 2302 2306 2310 2403                 |                          |                                        |
| UF                                  |                          | INTERFERENCE MONOCHROMATIZATION        |
| COUNTERS                            | RT                       | MONOCHROMATIC RADIATION                |
| DATA RECORDERS                      |                          | PARTICLE ENERGY                        |
| % DETECTORS                         |                          | POLARIZATION (WAVES)                   |
| DISPLAY DEVICES                     |                          |                                        |
| ENVIRONMENTAL MONITORING            |                          |                                        |
| GAS DETECTORS                       | 0708 1404 1411 2402 2903 |                                        |
| HELMET MOUNTED DISPLAYS             | GS                       | MEASURING INSTRUMENTS                  |
| IN-FLIGHT MONITORING                |                          | #MONOCHROMATORS                        |
| % INSTRUMENTS                       |                          | RADIATION SOURCES                      |
| % MEASUREMENT                       |                          | #MONOCHROMATORS                        |
| MEASURING INSTRUMENTS               |                          | COMPARATORS                            |
| OPTICAL SCANNERS                    | RT                       | DUCHROMATORS                           |
| POLLUTION MONITORING                |                          | GONIOMETERS                            |
| RADIATION MEASURING INSTRUMENTS     |                          | LIGHT SOURCES                          |
| SCANNING                            |                          | MONOCHROMATIC RADIATION                |
| WARNING                             |                          | OPTICAL EQUIPMENT                      |
| WARNING SYSTEMS                     |                          | PHOTOGRAPHIC MEASURING INSTRUMENTS     |
|                                     |                          | PHOTOGONIOMETERS                       |
|                                     |                          | SPECTROPHOTOMETERS                     |
| MONOCOCOQUE STRUCTURES              |                          |                                        |
| 0102 0104 0202 3202 3203            |                          |                                        |
| RT % CYLINDERS                      |                          |                                        |
| SHELLS (STRUCTURAL FORMS)           |                          |                                        |
| STRESSED-SKIN STRUCTURES            |                          |                                        |
| % STRUCTURES                        |                          |                                        |
| MONOCRYSTALS                        |                          |                                        |
| USE SINGLE CRYSTALS                 |                          |                                        |
| MONOCULAR VISION                    |                          |                                        |
| 0404 0408 0506 2310                 |                          |                                        |
| GS                                  |                          | VISION                                 |
| #MONOCULAR VISION                   |                          |                                        |
| HUMAN FACTORS ENGINEERING           |                          |                                        |
| MOTION PERCEPTION                   |                          |                                        |
| PERCEPTION                          |                          |                                        |
| SPACE PERCEPTION                    |                          |                                        |
| MONOETHANOLAMINE (MEA)              |                          |                                        |
| 0603 1808                           |                          |                                        |
| GS                                  |                          | AMINES                                 |
| #MONOETHANOLAMINE (MEA)             |                          |                                        |
| MONOIDS                             |                          |                                        |
| 1902                                |                          |                                        |
| GS                                  |                          | ALGEBRA                                |
| GROUP THEORY                        |                          |                                        |
| ..HOMOMORPHISMS                     |                          |                                        |
| ..#MONOIDS                          |                          |                                        |
| MONOLITHIC CIRCUITS                 |                          |                                        |
| USE INTEGRATED CIRCUITS             |                          |                                        |
| MONOMERS                            |                          |                                        |
| MONOCHROMATIZATION                  |                          |                                        |
| 2302 2306 2310 2403                 |                          |                                        |
| UF                                  |                          | INTERFERENCE MONOCHROMATIZATION        |
| COUNTERS                            | RT                       | MONOCHROMATIC RADIATION</              |



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.BREGUET 940 AIRCRAFT  
 .BREGUET 941 AIRCRAFT  
 .BREGUET 1150 AIRCRAFT  
 .BUCCANEER AIRCRAFT  
 .C-2 AIRCRAFT  
 .C-33 AIRCRAFT  
 .C-35 AIRCRAFT  
 .C-46 AIRCRAFT  
 .C-47 AIRCRAFT  
 .C-54 AIRCRAFT  
 .C-118 AIRCRAFT  
 .C-121 AIRCRAFT  
 .C-123 AIRCRAFT  
 .C-124 AIRCRAFT  
 .C-130 AIRCRAFT  
 .C-131 AIRCRAFT  
 .C-133 AIRCRAFT  
 .C-135 AIRCRAFT  
 .C-140 AIRCRAFT  
 .C-141 AIRCRAFT  
 .C-160 AIRCRAFT  
 .CANEERRA AIRCRAFT  
 .CESSNA L-19 AIRCRAFT  
 .CESSNA 172 AIRCRAFT  
 .CESSNA 205 AIRCRAFT  
 .CESSNA 210 AIRCRAFT  
 .CESSNA 402B AIRCRAFT  
 .CL-41 AIRCRAFT  
 .CL-44 AIRCRAFT  
 .COMET 4 AIRCRAFT  
 .CV-340 AIRCRAFT  
 .CV-440 AIRCRAFT  
 .CV-880 AIRCRAFT  
 .CV-990 AIRCRAFT  
 .D-558 AIRCRAFT  
 .DC 3 AIRCRAFT  
 .DC 7 AIRCRAFT  
 .DC 8 AIRCRAFT  
 .DH 112 AIRCRAFT  
 .DH 115 AIRCRAFT  
 .DH 121 AIRCRAFT  
 .DH 125 AIRCRAFT  
 .DHC 2 AIRCRAFT  
 .DHC 4 AIRCRAFT  
 .DHC 5 AIRCRAFT  
 .DO-27 AIRCRAFT  
 .DO-28 AIRCRAFT  
 .DO-31 AIRCRAFT  
 .EC-121 AIRCRAFT  
 .ELECTRA AIRCRAFT  
 .F-2 AIRCRAFT  
 .F-5 AIRCRAFT  
 .F-8 AIRCRAFT  
 .F-9 AIRCRAFT  
 .F-17 AIRCRAFT

.F-27 AIRCRAFT  
 .F-28 TRANSPORT AIRCRAFT  
 .F-84 AIRCRAFT  
 .F-86 AIRCRAFT  
 .F-89 AIRCRAFT  
 .F-94 AIRCRAFT  
 .F-100 AIRCRAFT  
 .F-102 AIRCRAFT  
 .F-104 AIRCRAFT  
 .F-105 AIRCRAFT  
 .F-106 AIRCRAFT  
 .FD 2 AIRCRAFT  
 .G-1 AIRCRAFT  
 .G-91 AIRCRAFT  
 .G-95/4 AIRCRAFT  
 .G-222 AIRCRAFT  
 .GA-5 AIRCRAFT  
 .H-126 AIRCRAFT  
 .HFB-320 AIRCRAFT  
 .HP-115 AIRCRAFT  
 .HS-748 AIRCRAFT  
 .IL-14 AIRCRAFT  
 .IL-62 AIRCRAFT  
 .JET PROVOST AIRCRAFT  
 .JINDIVIK TARGET AIRCRAFT  
 .L-29 JET TRAINER  
 .LOCKHEED MODEL 18 AIRCRAFT  
 .MH-262 AIRCRAFT  
 .MIRAGE AIRCRAFT  
 .MIRAGE 3 AIRCRAFT  
 .MYSTERE 20 AIRCRAFT  
 .NORD 1500 AIRCRAFT  
 .OV-1 AIRCRAFT  
 .OV-10 AIRCRAFT  
 .P-3 AIRCRAFT  
 .P-51 AIRCRAFT  
 .P-166 AIRCRAFT  
 .P-308 AIRCRAFT  
 .P-1127 AIRCRAFT  
 .P-1154 AIRCRAFT  
 .PD-808 AIRCRAFT  
 .PHANTOM AIRCRAFT  
 .F-4 AIRCRAFT  
 .RB-50 AIRCRAFT  
 .RF-4 AIRCRAFT  
 .S-2 AIRCRAFT  
 .SAAB 105 AIRCRAFT  
 .SC-1 AIRCRAFT  
 .SC-5 AIRCRAFT  
 .SC-7 AIRCRAFT  
 .SCIMITAR AIRCRAFT  
 .SE-210 AIRCRAFT  
 .SHACKLETON BOMBER  
 .T-2 AIRCRAFT  
 .T-28 AIRCRAFT

.T-33 AIRCRAFT  
 .T-37 AIRCRAFT  
 .T-38 AIRCRAFT  
 .T-39 AIRCRAFT  
 .TS-11 AIRCRAFT  
 .TSR-2 AIRCRAFT  
 .TU-104 AIRCRAFT  
 .TU-124 AIRCRAFT  
 .TU-134 AIRCRAFT  
 .U-2 AIRCRAFT  
 .U-10 AIRCRAFT  
 .VALIANT AIRCRAFT  
 .VC-10 AIRCRAFT  
 .VICTOR MK-1 AIRCRAFT  
 .VISCOUNT AIRCRAFT  
 .VJ-101 AIRCRAFT  
 .X-1 AIRCRAFT  
 .X-2 AIRCRAFT  
 .X-3 AIRCRAFT  
 .X-5 AIRCRAFT  
 .X-13 AIRCRAFT  
 .X-14 AIRCRAFT  
 .X-21 AIRCRAFT  
 .X-21A AIRCRAFT  
 .XC-142 AIRCRAFT  
 .XV-4 AIRCRAFT  
 .XV-5 AIRCRAFT  
 .YS-11 AIRCRAFT  
 .Z-37 AIRCRAFT  
 AERODYNAMIC CONFIGURATIONS  
 % AIRCRAFT  
 AIRFOILS  
 BIPLANES  
 CARGO AIRCRAFT  
 GLIDERS  
 % LOW WING AIRCRAFT  
 SEAPLANES  
 TAILLESS AIRCRAFT  
 WATER TAKEOFF AND LANDING AIRCRAFT  
 WING PLANFORMS  
 WING PROFILES  
 % WINGED VEHICLES  
 MONOPOLE ANTENNAS  
 0701 0702 0901  
 UF SPIKE ANTENNAS  
 GS ANTENNAS  
 .OMNIDIRECTIONAL ANTENNAS  
 .#MONOPOLE ANTENNAS  
 ...WHIP ANTENNAS  
 RT ANTENNA DESIGN  
 DIPOLE ANTENNAS  
 LOOP ANTENNAS  
 MONOPOLES  
 % SPIKES

MONOPOLES  
 O603 1203 2404  
 GS #MONOPOLES  
 .MAGNETIC MONOPOLES  
 RT % DIPOLES  
 MONOPOLE ANTENNAS  
 MULTIPOLES  
 % POLES  
 MONOPROPELLANTS  
 2702  
 GS FUELS  
 #MONOPROPELLANTS  
 ..AEROZINE  
 PROPELLANTS  
 .ROCKET PROPELLANTS  
 ..LIQUID ROCKET PROPELLANTS  
 ..#MONOPROPELLANTS  
 ....AEROZINE  
 AIRCRAFT FUELS  
 CHEMICAL FUELS  
 GASEOUS ROCKET PROPELLANTS  
 GELLED ROCKET PROPELLANTS  
 METAL PROPELLANTS  
 PLASTIC PROPELLANTS  
 PROPELLANT DECOMPOSITION  
 SLURRY PROPELLANTS  
 SOLID ROCKET PROPELLANTS  
 RT  
 MONOPULSE ANTENNAS  
 0701 0901  
 GS ANTENNAS  
 #MONOPULSE ANTENNAS  
 RT DIRECTIONAL ANTENNAS  
 PHASED ARRAYS  
 WAVEGUIDE ANTENNAS  
 MONOPULSE RADAR  
 0705  
 GS RADAR  
 .PULSE RADAR  
 ..PULSE DOPPLER RADAR  
 ..#MONOPULSE RADAR  
 RT DOPPLER RADAR  
 DUPLEXERS  
 RADAR TRACKING  
 TRACKING RADAR  
 MONOSACCHARIDES  
 0403 1808  
 GS ORGANIC COMPOUNDS  
 .CARBOHYDRATES  
 ..SUGARS  
 ..#MONOSACCHARIDES  
 ....HEXOSES  
 ....GALACTOSE  
 ....GLUCOSE  
 ....PENTOSE  
 ....RIBOSE  
 ....XYLOSE  
 MONOSCOPES  
 0605 0701 0702 0905 1002  
 GS TELEVISION EQUIPMENT  
 #MONOSCOPES  
 RT CAMERA TUBES  
 ELECTRON BEAMS  
 IMAGE TUBES  
 SECONDARY EMISSION  
 % TEST EQUIPMENT  
 MONOSTABLE MULTIVIBRATORS  
 0701 0905 1001 1002 2311  
 GS CIRCUITS  
 .MULTIVIBRATORS  
 .#MONOSTABLE MULTIVIBRATORS  
 MONOTECTIC ALLOYS  
 1701  
 GS ALLOYS  
 #MONOTECTIC ALLOYS  
 RT COMPOSITE MATERIALS  
 % MATRICES  
 METAL MATRIX COMPOSITES  
 METALS  
 MONOTONE FUNCTIONS  
 1902 1903  
 GS FUNCTIONS (MATHEMATICS)  
 #MONOTONE FUNCTIONS  
 RT ANALYSIS (MATHEMATICS)  
 CALCULUS  
 REAL VARIABLES  
 MONOTONY  
 0408 0410  
 RT BOREDOM  
 LETHARGY  
 SENSORY DEPRIVATION  
 MONSOONS  
 2001 2003  
 GS WIND (METEOROLOGY)  
 #MONSOONS  
 RT ANNUAL VARIATIONS  
 ATMOSPHERIC CIRCULATION  
 GROUND WIND  
 PRECIPITATION (METEOROLOGY)  
 SEA BREEZE  
 MONTANA  
 1305  
 GS NATIONS  
 .UNITED STATES  
 .#MONTANA  
 BIGHORN MOUNTAINS (MT-WY)  
 MISSOURI RIVER (US)  
 WILLISTON BASIN (NORTH AMERICA)  
 YELLOWSTONE NATIONAL PARK  
 (ID-MT-WY)  
 MONTE CARLO METHOD  
 0802 1902 1905 3501 4001  
 GS ANALYSIS (MATHEMATICS)  
 .NUMERICAL ANALYSIS  
 .#MONTE CARLO METHOD  
 RT DIFFUSION THEORY  
 EXPECTANCY HYPOTHESIS  
 GAME THEORY  
 MARKOV CHAINS  
 MATHEMATICAL MODELS  
 % METHODOLOGY  
 PROBABILITY THEORY  
 RANDOM PROCESSES  
 RANDOM WALK  
 RENORMALIZATION GROUP METHODS  
 SIMULATION  
 STATISTICAL ANALYSIS  
 STOCHASTIC PROCESSES  
 TRANSPORT THEORY  
 MONTEREY BAY (CA)  
 1305 1306 1310  
 GS BAYS (TOPOGRAPHIC FEATURES)  
 #MONTEREY BAY (CA)  
 RT CALIFORNIA  
 PACIFIC OCEAN  
 MONTH  
 1406  
 UF LUNATION  
 RT CALENDARS  
 TIME  
 UNITS OF MEASUREMENT  
 MONTICELLITE  
 1804 1806  
 GS CALCIUM COMPOUNDS  
 #MONTICELLITE  
 MAGNESIUM COMPOUNDS  
 #MONTICELLITE  
 MINERALS  
 #MONTICELLITE  
 SILICON COMPOUNDS

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|                       |                                  |                                     |
|-----------------------|----------------------------------|-------------------------------------|
| .SILICATES            | LUNAR PHASES                     | SATURN RINGS                        |
| .#MONTICELLITE        | LUNAR PHOTOGRAPHY                | URANUS RINGS                        |
| RT OLIVINE            | LUNAR RAYS                       |                                     |
|                       | LUNAR SHADOW                     |                                     |
| MONTMORILLONITE       | LUNAR SOIL                       | MOONQUAKES                          |
| 1804 1806             | LUNAR TEMPERATURE                | 1306 1308 3001                      |
| GS ALUMINUM COMPOUNDS | LUNAR TOPOGRAPHY                 | GS SEISMOLOGY                       |
| .ALUMINUM SILICATES   | SELENOGRAPHY                     | #MOONQUAKES                         |
| .#MONTMORILLONITE     | SELENOLOGY                       | RT LUNAR GEOLOGY                    |
| CLAYS                 | TERRAFORMING                     | LUNAR TIDES                         |
| #MONTMORILLONITE      |                                  | PLANETARY QUAKES                    |
| MINERALS              |                                  | SELENOLOGY                          |
| #MONTMORILLONITE      | MOON ILLUSION                    |                                     |
| SILICON COMPOUNDS     | O408 O410                        | MOONS                               |
| .SILICATES            | GS PSYCHOLOGICAL EFFECTS         | USE NATURAL SATELLITES              |
| ..ALUMINUM SILICATES  | .ILLUSIONS                       |                                     |
| ..#MONTMORILLONITE    | .#MOON ILLUSION                  | MOORING                             |
| RT BENTONITE          | RT OPTICAL ILLUSION              | 1102 1104 1105 2103                 |
|                       | SENSORY FEEDBACK                 | UF MOORINGS                         |
|                       |                                  | RT AIRPORTS                         |
| MOODS                 | MOON-EARTH TRAJECTORIES          | ANCHORS (FASTENERS)                 |
| O410                  | 1904 3004 3006 3009              | FASTENERS                           |
| RT EMOTIONAL FACTORS  | GS TRAJECTORIES                  | % JOINING                           |
| EMOTIONS              | .SPACECRAFT TRAJECTORIES         | MATERIALS HANDLING                  |
| PSYCHOLOGICAL EFFECTS | ..LUNAR TRAJECTORIES             | MULTIPLE DOCKING ADAPTERS           |
| PSYCHOLOGICAL FACTORS | ..#MOON-EARTH TRAJECTORIES       | SPACECRAFT DOCKING                  |
| SENSORY FEEDBACK      | RT APOLLO 5 FLIGHT               |                                     |
|                       | APOLLO 6 FLIGHT                  | MOORINGS                            |
|                       | APOLLO 7 FLIGHT                  | USE MOORING                         |
|                       | APOLLO 8 FLIGHT                  |                                     |
|                       | APOLLO 10 FLIGHT                 | MOPS (PROPULSION SYSTEMS)           |
|                       | APOLLO 11 FLIGHT                 | USE MAN OPERATED PROPULSION SYSTEMS |
|                       | APOLLO 12 FLIGHT                 |                                     |
|                       | APOLLO 13 FLIGHT                 | MORAINES                            |
|                       | APOLLO 14 FLIGHT                 | USE GLACIAL DRIFT                   |
|                       | APOLLO 15 FLIGHT                 |                                     |
|                       | APOLLO 16 FLIGHT                 | MORALE                              |
|                       | APOLLO 17 FLIGHT                 | O408 O410 O502 3401                 |
|                       | CIRCUMLUNAR TRAJECTORIES         | RT CREATIVITY                       |
|                       | EARTH-MOON TRAJECTORIES          | DISCIPLINING                        |
|                       | GODDARD TRAJECTORY DETERMINATION | LEADERSHIP                          |
|                       | SYSTEM                           | MOTIVATION                          |
|                       | LUNAR FLIGHT                     | PRODUCTIVITY                        |
|                       | MASS DRIVERS                     | PSYCHOLOGY                          |
|                       | ORBITAL MECHANICS                | RECREATION                          |
|                       | REENTRY TRAJECTORIES             |                                     |
|                       | ROUND TRIP TRAJECTORIES          | MOREHOUSE COMET                     |
|                       | TRANSFER ORBITS                  | 3001 3005                           |
|                       |                                  | GS CELESTIAL BODIES                 |
|                       | MOONLETS                         | .COMETS                             |
| 3003                  | GS CELESTIAL BODIES              | .#MOREHOUSE COMET                   |
| RT                    | #MOONLETS                        | RT SOLAR SYSTEM                     |
|                       | JUPITER RINGS                    |                                     |
|                       | NATURAL SATELLITES               | MORL                                |
|                       | PLANETARY RINGS                  | USE MANNED ORBITAL LABORATORIES     |

MORNING  
1308 3001  
RT DAYTIME  
SUNRISE

MOROCCO  
1305  
GS NATIONS  
#MOROCCO  
RT AFRICA

MORPHINE  
O403 O405 O408 1808  
GS BASES (CHEMICAL)  
.ALKALOIDS  
.#MORPHINE  
DRUGS  
.NARCOTICS  
.#MORPHINE  
NITROGEN COMPOUNDS  
.ALKALOIDS  
.#MORPHINE  
ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
.HETEROCYCLIC COMPOUNDS  
.ALKALOIDS  
.#MORPHINE

MORPHOLOGICAL INDEXES  
O602 O603  
GS RATIOS  
.INDEXES (RATIOS)  
.#MORPHOLOGICAL INDEXES  
RT MORPHOLOGY

MORPHOLOGY  
O404 1306 3405  
GS #MORPHOLOGY  
.GEOMORPHOLOGY  
.ISOMORPHISM  
.LUNG MORPHOLOGY  
.POLYMORPHISM  
RT ANATOMY  
% BIOLOGY  
DIFFERENTIATION (BIOLOGY)  
GEOLOGY  
HISTOLOGY  
% MATHEMATICS  
MORPHOLOGICAL INDEXES  
SHAPES  
VESTIBULES

MORPHOTROPISM  
USE ISOMORPHISM

MORSE CODE  
O702 O703  
RT % CODES  
COMMUNICATING  
KEYING  
RADIO TELEGRAPHY  
TELECOMMUNICATION

MORSE POTENTIAL  
1202 1203 1902  
RT DIATOMIC MOLECULES  
KINETIC THEORY  
POTENTIAL ENERGY

MORTALITY  
O404 O405 O408 O411  
RT AGING (BIOLOGY)  
DEATH  
EXPIRATION  
LIFE SPAN  
MILLS RATIO

MORTARS (MATERIAL)  
1504 1801 1805 1806 3401  
RT ADMIXTURES  
BRICKS  
CEMENTS  
CERAMICS  
CONCRETES  
GROUT  
MASONRY  
PLASTERS  
REFRACTORIES

MOS (JAPANESE SPACECRAFT)  
USE JAPANESE SPACECRAFT

MOS (SEMICONDUCTORS)  
USE METAL OXIDE SEMICONDUCTORS

MOSAICS  
O701 O702 1407  
RT ASSEMBLIES  
DIFFRACTION  
FOCAL PLANE DEVICES  
% NETWORKS  
PHOTOGRAPHS

MOSCOW  
1305  
GS CITIES  
#MOSCOW  
RT U.S.S.R.

MOSFET

USE FIELD EFFECT TRANSISTORS

MOSS (SPACE STATIONS)  
USE SPACE STATIONS

MOSSBAUER EFFECT  
O603 2402  
RT CRYSTAL LATTICES  
% EFFECTS  
ELECTROMAGNETIC ABSORPTION  
FLUORESCENCE  
GAMMA RAYS  
LASER INDUCED FLUORESCENCE  
RESONANCE SCATTERING  
RESONANT FREQUENCIES

MOSSES  
USE BRYOPHYTES

MOT (ORBITAL TELESCOPES)  
USE MANNED ORBITAL TELESCOPES

MOTHS  
O402  
GS ANIMALS  
.INVERTEBRATES  
.ARTHROPODS  
.INSECTS  
.#MOTHS  
.SILKWORMS  
RT BOLLWORMS  
INFESTATION

MOTILITY  
USE LOCOMOTION

% MOTION  
O101 O201 1202 2003 2311 3009  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
UF MOVEMENT  
RT ACCELERATION (PHYSICS)  
ATTITUDE (INCLINATION)  
BROWNIAN MOVEMENTS  
DISPLACEMENT  
DOMAIN WALL  
GLIDING  
GYRATION  
HARMONIC MOTION  
HEAD MOVEMENT  
HEAVING  
HIGH ACCELERATION  
IMMOBILIZATION  
INERTIA

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

|                                                                                                                                                             |  |  |  |                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------|
| MOTOR SYSTEMS (BIOLOGY)                                                                                                                                     |  |  |  | SUSPENDING (HANGING) |
| USE EFFERENT NERVOUS SYSTEMS                                                                                                                                |  |  |  |                      |
| MOTOR VEHICLES                                                                                                                                              |  |  |  |                      |
| 1504                                                                                                                                                        |  |  |  |                      |
| GS                                                                                                                                                          |  |  |  |                      |
| SURFACE VEHICLES                                                                                                                                            |  |  |  |                      |
| #MOTOR VEHICLES                                                                                                                                             |  |  |  |                      |
| ..AUTOMATED MIXED TRAFFIC VEHICLES                                                                                                                          |  |  |  |                      |
| ..AUTOMOBILES                                                                                                                                               |  |  |  |                      |
| ..ELECTRIC AUTOMOBILES                                                                                                                                      |  |  |  |                      |
| ..ELECTRIC MOTOR VEHICLES                                                                                                                                   |  |  |  |                      |
| ..TRACTORS                                                                                                                                                  |  |  |  |                      |
| ..CRAWLER TRACTORS                                                                                                                                          |  |  |  |                      |
| ..TRACKED VEHICLES                                                                                                                                          |  |  |  |                      |
| ..TRUCKS                                                                                                                                                    |  |  |  |                      |
| ..TANK TRUCKS                                                                                                                                               |  |  |  |                      |
| TRANSPORTATION                                                                                                                                              |  |  |  |                      |
| % VEHICLES                                                                                                                                                  |  |  |  |                      |
| RT                                                                                                                                                          |  |  |  |                      |
| MOTORS                                                                                                                                                      |  |  |  |                      |
| O301                                                                                                                                                        |  |  |  |                      |
| SN                                                                                                                                                          |  |  |  |                      |
| (LIMITED TO MACHINES SUPPLIED WITH EXTERNAL ENERGY WHICH IS CONVERTED INTO FORCE AND/OR MOTION--SEE ENGINES FOR MACHINES WITH SELF-CONTAINED POWER SOURCES) |  |  |  |                      |
| #MOTORS                                                                                                                                                     |  |  |  |                      |
| ..ELECTRIC MOTORS                                                                                                                                           |  |  |  |                      |
| ..ASYNCHRONOUS MOTORS                                                                                                                                       |  |  |  |                      |
| ..INDUCTION MOTORS                                                                                                                                          |  |  |  |                      |
| ..MICROMOTORS                                                                                                                                               |  |  |  |                      |
| ..STEPPING MOTORS                                                                                                                                           |  |  |  |                      |
| ..SYNCHRONOUS MOTORS                                                                                                                                        |  |  |  |                      |
| ..TORQUE MOTORS                                                                                                                                             |  |  |  |                      |
| ..SERVOMOTORS                                                                                                                                               |  |  |  |                      |
| APOGEE BOOST MOTORS                                                                                                                                         |  |  |  |                      |
| ELECTRIC EQUIPMENT                                                                                                                                          |  |  |  |                      |
| ENERGY CONVERSION EFFICIENCY                                                                                                                                |  |  |  |                      |
| ENGINES                                                                                                                                                     |  |  |  |                      |
| % GENERATORS                                                                                                                                                |  |  |  |                      |
| HYDRAULIC EQUIPMENT                                                                                                                                         |  |  |  |                      |
| STATORS                                                                                                                                                     |  |  |  |                      |
| MOTS (TRACKING SYSTEM)                                                                                                                                      |  |  |  |                      |
| USE MINITRACK SYSTEM                                                                                                                                        |  |  |  |                      |
| MOUNTAIN INHABITANTS                                                                                                                                        |  |  |  |                      |
| O401 O402 O404 O405 O408 O502                                                                                                                               |  |  |  |                      |
| GS COMMUNITIES                                                                                                                                              |  |  |  |                      |
| .INHABITANTS                                                                                                                                                |  |  |  |                      |
| ..#MOUNTAIN INHABITANTS                                                                                                                                     |  |  |  |                      |
| ALTITUDE ACCLIMATIZATION                                                                                                                                    |  |  |  |                      |
| HIGH ALTITUDE ENVIRONMENTS                                                                                                                                  |  |  |  |                      |
| LOW TEMPERATURE ENVIRONMENTS                                                                                                                                |  |  |  |                      |
| RT                                                                                                                                                          |  |  |  |                      |
| MOUNTAINS                                                                                                                                                   |  |  |  |                      |
| 1306 1308                                                                                                                                                   |  |  |  |                      |
| GS LANDFORMS                                                                                                                                                |  |  |  |                      |
| #MOUNTAINS                                                                                                                                                  |  |  |  |                      |
| ..ADIRONDACK MOUNTAINS (NY)                                                                                                                                 |  |  |  |                      |
| ..ALPS MOUNTAINS (EUROPE)                                                                                                                                   |  |  |  |                      |
| ..ANDES MOUNTAINS (SOUTH AMERICA)                                                                                                                           |  |  |  |                      |
| ..APPALACHIAN MOUNTAINS (NORTH AMERICA)                                                                                                                     |  |  |  |                      |
| ..BIG HORN MOUNTAINS (MT-WY)                                                                                                                                |  |  |  |                      |
| ..BLACK HILLS (SD-WY)                                                                                                                                       |  |  |  |                      |
| ..CARPATHIAN MOUNTAINS (EUROPE)                                                                                                                             |  |  |  |                      |
| ..CASCADE RANGE (CA-OR-WA)                                                                                                                                  |  |  |  |                      |
| ..CAUCASUS MOUNTAINS (U.S.S.R.)                                                                                                                             |  |  |  |                      |
| ..COASTAL RANGES (CA)                                                                                                                                       |  |  |  |                      |
| ..GREAT SMOKY MOUNTAINS (NC-TN)                                                                                                                             |  |  |  |                      |
| ..HIMALAYAS                                                                                                                                                 |  |  |  |                      |
| ..PENINSULAR RANGES (CA)                                                                                                                                    |  |  |  |                      |
| ..PYRENEES MOUNTAINS (EUROPE)                                                                                                                               |  |  |  |                      |
| ..ROCKY MOUNTAINS (NORTH AMERICA)                                                                                                                           |  |  |  |                      |
| ..SAN JUAN MOUNTAINS (CO)                                                                                                                                   |  |  |  |                      |
| ..SIERRA NEVADA MOUNTAINS (CA)                                                                                                                              |  |  |  |                      |
| ..WIND RIVER RANGE (WY)                                                                                                                                     |  |  |  |                      |
| ..WRANGELL MOUNTAINS (AK)                                                                                                                                   |  |  |  |                      |
| CENTRAL PIEDMONT (US)                                                                                                                                       |  |  |  |                      |
| CIRQUES (LANDFORMS)                                                                                                                                         |  |  |  |                      |
| CONES (VOLCANOES)                                                                                                                                           |  |  |  |                      |
| CONTINENTS                                                                                                                                                  |  |  |  |                      |
| DIVIDES (LANDFORMS)                                                                                                                                         |  |  |  |                      |
| FORMATION                                                                                                                                                   |  |  |  |                      |
| GAPS (GEOLOGY)                                                                                                                                              |  |  |  |                      |
| GEOMORPHOLOGY                                                                                                                                               |  |  |  |                      |
| HIGHLANDS                                                                                                                                                   |  |  |  |                      |
| MARS VOLCANOES                                                                                                                                              |  |  |  |                      |
| MASSIFS                                                                                                                                                     |  |  |  |                      |
| MESAS                                                                                                                                                       |  |  |  |                      |
| OROGRAPHY                                                                                                                                                   |  |  |  |                      |
| % PEAKS                                                                                                                                                     |  |  |  |                      |
| PEAKS (LANDFORMS)                                                                                                                                           |  |  |  |                      |
| PIEDMONTS                                                                                                                                                   |  |  |  |                      |
| PIKE'S PEAK (CO)                                                                                                                                            |  |  |  |                      |
| % RIDGES                                                                                                                                                    |  |  |  |                      |
| TERRACES (LANDFORMS)                                                                                                                                        |  |  |  |                      |
| VOLCANOES                                                                                                                                                   |  |  |  |                      |
| VOLCANOLOGY                                                                                                                                                 |  |  |  |                      |
| WATERSHEDS                                                                                                                                                  |  |  |  |                      |
| MOUNTING                                                                                                                                                    |  |  |  |                      |
| O202 1504 1507 2806 3404 3407                                                                                                                               |  |  |  |                      |
| GS #MOUNTING                                                                                                                                                |  |  |  |                      |
| .RIGID MOUNTING                                                                                                                                             |  |  |  |                      |
| RT ASSEMBLING                                                                                                                                               |  |  |  |                      |
| % ATTACHMENT                                                                                                                                                |  |  |  |                      |
| BRACKETS                                                                                                                                                    |  |  |  |                      |
| % JOINING                                                                                                                                                   |  |  |  |                      |
| MOUNTAIN INHABITANTS                                                                                                                                        |  |  |  |                      |
| O401 O402 O404 O405 O408 O502                                                                                                                               |  |  |  |                      |
| GS COMMUNITIES                                                                                                                                              |  |  |  |                      |
| .INHABITANTS                                                                                                                                                |  |  |  |                      |
| ..#MOUNTAIN INHABITANTS                                                                                                                                     |  |  |  |                      |
| ALTITUDE ACCLIMATIZATION                                                                                                                                    |  |  |  |                      |
| HIGH ALTITUDE ENVIRONMENTS                                                                                                                                  |  |  |  |                      |
| LOW TEMPERATURE ENVIRONMENTS                                                                                                                                |  |  |  |                      |
| RT                                                                                                                                                          |  |  |  |                      |
| MOUNTAINS                                                                                                                                                   |  |  |  |                      |
| 1306 1308                                                                                                                                                   |  |  |  |                      |
| GS LANDFORMS                                                                                                                                                |  |  |  |                      |
| #MOUNTAINS                                                                                                                                                  |  |  |  |                      |
| ..ADIRONDACK MOUNTAINS (NY)                                                                                                                                 |  |  |  |                      |
| ..ALPS MOUNTAINS (EUROPE)                                                                                                                                   |  |  |  |                      |
| ..ANDES MOUNTAINS (SOUTH AMERICA)                                                                                                                           |  |  |  |                      |
| ..APPALACHIAN MOUNTAINS (NORTH AMERICA)                                                                                                                     |  |  |  |                      |
| ..BIG HORN MOUNTAINS (MT-WY)                                                                                                                                |  |  |  |                      |
| ..BLACK HILLS (SD-WY)                                                                                                                                       |  |  |  |                      |
| ..CARPATHIAN MOUNTAINS (EUROPE)                                                                                                                             |  |  |  |                      |
| ..CASCADE RANGE (CA-OR-WA)                                                                                                                                  |  |  |  |                      |
| ..CAUCASUS MOUNTAINS (                                                                                                                                      |  |  |  |                      |

# NASA THESAURUS HIERARCHICAL UPDATE

## % MILITARY AIRCRAFT

MRKOS COMET  
 3001 3005  
 GS CELESTIAL BODIES  
 .COMETS  
 .#MRKOS COMET  
 RT SOLAR SYSTEM

MSAT  
 1901  
 GS ARTIFICIAL SATELLITES  
 .COMMUNICATION SATELLITES  
 .#MSAT  
 RT GROUND STATIONS  
 LAND MOBILE SATELLITE SERVICE  
 MARITIME SATELLITES  
 MOBILE COMMUNICATION SYSTEMS  
 RADIO COMMUNICATION  
 RADIO RELAY SYSTEMS  
 SATELLITE TRANSMISSION

MSBLS  
 USE MICROWAVE SCANNING BEAM LANDING  
 SYSTEM

MSM (SEMICONDUCTORS)  
 0903 0906  
 UF METAL-SEMICONDUCTOR-METAL  
 SEMICONDUCTORS  
 GS ELECTRONIC EQUIPMENT  
 .SOLID STATE DEVICES  
 .SEMICONDUCTOR DEVICES  
 .#MSM (SEMICONDUCTORS)  
 RT MIM DIODES  
 PHOTODIODES  
 SCHOTTKY DIODES  
 SEMICONDUCTOR JUNCTIONS  
 SIS (SEMICONDUCTORS)

MSRE REACTORS  
 USE MOLTEN SALT NUCLEAR REACTORS

MTBF 1505 1905 4001  
 UF MEAN TIME BETWEEN FAILURES  
 GS TIME  
 #MTBF  
 RT DOWNTIME  
 FAILURE ANALYSIS  
 FAILURE MODES  
 LIFE (DURABILITY)  
 RATES (PER TIME)  
 RELIABILITY  
 STATISTICAL ANALYSIS

MTF  
 USE MODULATION TRANSFER FUNCTION

MTFF (SPACE STATION)  
 USE MAN TENDED FREE FLYERS

MTI RADAR  
 USE MOVING TARGET INDICATORS

MUBIS (SCANNERS)  
 USE MULTIPLE BEAM INTERVAL SCANNERS

MUCOCELES  
 0405 0406 0408  
 GS CYSTS  
 #MUCOCELES  
 RT % BLISTERS

MUCUS  
 0404 0405  
 GS BODY FLUIDS  
 #MUCUS  
 RT SALIVA

MUD  
 1306 2001  
 GS SEDIMENTS  
 #MUD  
 SOILS  
 #MUD  
 RT ALLUVIUM  
 CLAYS  
 FANS (LANDFORMS)  
 GROUT  
 OCEAN BOTTOM  
 RAIN EROSION  
 SLUDGE  
 TIDAL FLATS

MUFFLERS  
 0202 0203  
 RT ACOUSTIC RETROFITTING  
 AIRCRAFT NOISE  
 ATTENUATORS  
 BAFFLES  
 DAMPING  
 % DIFFUSERS  
 EXHAUST SYSTEMS  
 FURNACES  
 JET AIRCRAFT NOISE  
 NOISE (SOUND)  
 NOISE REDUCTION  
 PROPELLER NOISE  
 ROCKET ENGINE NOISE

SILENCERS  
 SUPPRESSORS

MULBERRY (ALLOY)  
 1701  
 GS ALLOYS  
 #MULBERRY (ALLOY)  
 RT ANTIMONY ALLOYS  
 MOLYBDENUM ALLOYS

MULLITES  
 0603 1806  
 RT ALUMINUM SILICATES  
 MINERALS

MULTI-ANODE MICROCHANNEL ARRAYS  
 2311  
 GS ARRAYS  
 #MULTI-ANODE MICROCHANNEL ARRAYS  
 RT ANODES  
 MICROCHANNELS  
 RADIATION DETECTORS  
 SPACEBORNE TELESCOPES  
 TELESCOPES  
 X RAY DETECTORS

MULTI-ROLE COMBAT AIRCRAFT  
 USE MRCA AIRCRAFT

MULTIBEAM ANTENNAS  
 0701  
 GS ANTENNAS  
 #MULTIBEAM ANTENNAS  
 RT BEAMS (RADIATION)  
 LENS ANTENNAS  
 MICROWAVE ANTENNAS  
 REFLECTOR ANTENNAS  
 SATELLITE ANTENNAS  
 SATELLITE COMMUNICATION

MULTICHANNEL COMMUNICATION  
 0702 0705  
 GS TELECOMMUNICATION  
 #MULTICHANNEL COMMUNICATION  
 RT CODE DIVISION MULTIPLE ACCESS  
 INTERFERENCE FACTOR TABLE  
 MULTIPLE ACCESS  
 RADIO TRANSMITTERS  
 TELECONFERENCING  
 TIME DIVISION MULTIPLE ACCESS

MULTICHANNEL PLATES  
 USE MICROCHANNEL PLATES

MULTIENGINE VEHICLES

```

0201 1103 1108 1504 2801 2808 3110
3501
RT % AIRCRAFT
  B-1 AIRCRAFT
  LAUNCH VEHICLES
  LIGHT TRANSPORT AIRCRAFT
  MISSILE CONFIGURATIONS
  MISSILES
  MULTISTAGE ROCKET VEHICLES
  RECOVERABLE LAUNCH VEHICLES
  ROCKET VEHICLES
  % VEHICLES

MULTIGRID METHODS
1902 1903
GS ANALYSIS (MATHEMATICS)
  .NUMERICAL ANALYSIS
  ..APPROXIMATION
  ..#MULTIGRID METHODS
RT COMPUTATIONAL FLUID DYNAMICS
  COMPUTATIONAL GRIDS
  FINITE DIFFERENCE THEORY
  FINITE ELEMENT METHOD
  GRID GENERATION (MATHEMATICS)
  ITERATION
  ITERATIVE SOLUTION

MULTILAYER INSULATION
2303 3303 3305 3501
GS INSULATION
  #MULTILAYER INSULATION
  INTERLAYERS
  #MULTILAYER INSULATION
RT COMPOSITE MATERIALS
  CRYOGENIC FLUID STORAGE
  FABRICS
  % FOILS
  FOILS (MATERIALS)
  LAMINATES
  % LAYERS
  METAL FOILS
  PLY ORIENTATION
  SANDWICH STRUCTURES
  % SHEETS

MULTILAYER STRUCTURES
USE LAMINATES

MULTILOOP SYSTEMS
USE CASCADE CONTROL

MULTIMEDIA
0803 9001
UF HYPERMEDIA
  INTERACTIVE MULTIMEDIA

INTERMEDIA
RT AUDIO VISUAL EQUIPMENT
  AUDIO VISUAL MATERIAL
  COMPUTER GRAPHICS
  GRAPHIC ARTS
  IMAGING TECHNIQUES
  INFORMATION SYSTEMS
  TELECONFERENCING
  TRAINING DEVICES
  VIDEO COMMUNICATION
  VIDEO DATA
  VIDEO TAPE RECORDERS
  VIDEO TAPES
  VISUAL AIDS
  VOICE COMMUNICATION
  MULTIMISSION MODULAR SPACECRAFT
  3107
  UF MMS
  RT BESS (SATELLITE)
  LANDSAT FOLLOW-ON MISSIONS
  SATELLITE NETWORKS
  SOLAR MAXIMUM MISSION

MULTIMODE RESONATORS
0701 0705 0905
GS RESONATORS
  #MULTIMODE RESONATORS
RT CAVITY RESONATORS
  MAGNETRONS
  PROPAGATION MODES

MULTIPACTOR DISCHARGES
0705 0904 0905 2304
GS ELECTRIC CURRENT
  .ELECTRIC DISCHARGES
  .#MULTIPACTOR DISCHARGES
RT LINEAR ACCELERATORS
  PHOTOMULTIPLIER TUBES
  SECONDARY EMISSION
  SPARK GAPS

MULTIPATH TRANSMISSION
0702 0710 2402
GS TRANSMISSION
  .ELECTROMAGNETIC WAVE TRANSMISSION
  ..RADIO TRANSMISSION
  ..#MULTIPATH TRANSMISSION
  .SIGNAL TRANSMISSION
  ..RADIO TRANSMISSION
  ..#MULTIPATH TRANSMISSION
RT CEPSTRAL ANALYSIS
  DIFFRACTION PATHS
  FERMAT PRINCIPLE
  MULTISTATIC RADAR

MULTIPHASE FLOW
1202 1203 1204
UF MIXED FLOW
GS FLUID FLOW
  #MULTIPHASE FLOW
  ..TWO PHASE FLOW
  RT CONICAL FLOW
  CRITICAL FLOW
  CROCCO-LEE THEORY
  FLOW DISTORTION
  FLOW MEASUREMENT
  GAS FLOW
  LAMINAR FLOW
  LIQUID FLOW
  MASS FLOW
  ORIFICE FLOW
  PIPE FLOW
  PRESSURE GRADIENTS
  SINGLE-PHASE FLOW
  SOLIDS FLOW
  STEADY FLOW
  STEAM FLOW
  SUBCRITICAL FLOW
  SUPERCRITICAL FLOW
  TURBULENT FLOW
  UNIFORM FLOW
  UNSTEADY FLOW

MULTIPHOTON ABSORPTION
2402
GS ENERGY ABSORPTION
  .RADIATION ABSORPTION
  ..ELECTROMAGNETIC ABSORPTION
  ..#MULTIPHOTON ABSORPTION
RT % ABSORPTION
  PHOTON ABSORPTIOMETRY

MULTIPLE ACCESS
0703
GS TELECOMMUNICATION
  #MULTIPLE ACCESS
  ..ALOHA SYSTEM
  ..CODE DIVISION MULTIPLE ACCESS
  ..DEMAND ASSIGNMENT MULTIPLE ACCESS
  ..FREQUENCY DIVISION MULTIPLE ACCESS
  ACCESS
  ..TIME DIVISION MULTIPLE ACCESS
  TRANSMISSION
  .SIGNAL TRANSMISSION

OPTICAL PATHS
% PATHS
  RADIO WAVES
  SOUND TRANSMISSION
  WAVE PROPAGATION

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# NASA THESAURUS HIERARCHICAL UPDATE

..DATA TRANSMISSION  
 ..#MULTIPLE ACCESS  
 ....ALPHA SYSTEM  
 ....CODE DIVISION MULTIPLE ACCESS  
 ....FREQUENCY DIVISION MULTIPLE ACCESS  
 ..ACCESS CONTROL  
 ..FREQUENCY DIVISION MULTIPLEXING  
 ..MULTICHANNEL COMMUNICATION  
 ..PACKET SWITCHING  
 ..PULSE COMMUNICATION  
 ..WIDEBAND COMMUNICATION

RT

MULTIPLE BEAM INTERVAL SCANNERS  
 0701 0702 0705 0901  
 UF MUBIS (SCANNERS)  
 GS ANTENNAS  
 #MULTIPLE BEAM INTERVAL SCANNERS  
 RT LINEAR ARRAYS  
 RADAR SCANNING

MULTIPLE DOCKING ADAPTERS  
 3110 1504 3203 3502  
 UF MDA  
 GS ADAPTERS  
 #MULTIPLE DOCKING ADAPTERS  
 RT AIRLOCK MODULES  
 MOORING  
 ORBITAL RENDEZVOUS  
 SATURN WORKSHOPS  
 SATURN 1 WORKSHOP  
 SATURN 5 WORKSHOP  
 SKYLAB 1  
 SKYLAB 2  
 SKYLAB 3  
 SKYLAB 4  
 SPACECRAFT DOCKING

MULTIPLE FREQUENCY RADAR  
 USE MULTISPECTRAL RADAR

MULTIPLE INPUT MULTIPLE OUTPUT  
 USE MIMO (CONTROL SYSTEMS)

MULTIPLE INSTRUCTION MULTIPLE DATA STREAM  
 USE MIMD (COMPUTERS)

MULTIPLE OUTPUT PROGRAMS  
 0802 0803  
 GS COMPUTER PROGRAMS  
 #MULTIPLE OUTPUT PROGRAMS  
 RT MULTIPROGRAMMING  
 READOUT  
 TIME SHARING

MULTIPLE TARGET TRACKING  
 0709  
 GS TRACKING (POSITION)  
 #MULTIPLE TARGET TRACKING  
 RT OPTICAL TRACKING  
 RADAR TARGETS  
 RADAR TRACKING  
 TARGET ACQUISITION  
 TARGET RECOGNITION  
 TARGETS  
 TRACKING FILTERS  
 TRACKING PROBLEM

MULTIPLE TARGET TRAJECTORY SYSTEMS  
 USE MATTS (SYSTEMS)

MULTIPLETS  
 USE FINE STRUCTURE

MULTIPLEX TRANSMISSION  
 USE MULTIPLEXING

MULTIPLEXERS  
 USE MULTIPLEXING

MULTIPLEXING  
 0705 0708 0710 0802 3407  
 UF MULTIPLEX TRANSMISSION  
 MULTIPLEXERS  
 GS TRANSMISSION  
 #MULTIPLEXING  
 ..CODE DIVISION MULTIPLEXING  
 ..FREQUENCY DIVISION MULTIPLEXING  
 ..TIME DIVISION MULTIPLEXING  
 ..WAVELENGTH DIVISION MULTIPLEXING  
 RT ACCESS CONTROL  
 CARRIER FREQUENCIES  
 CODE DIVISION MULTIPLE ACCESS  
 DATA TRANSMISSION  
 DEMULTIPLEXING  
 FREQUENCY DIVISION MULTIPLE ACCESS  
 PULSE COMMUNICATION  
 RADIO TRANSMISSION  
 SATELLITE TRANSMISSION  
 SIGNAL TRANSMISSION

MULTIPLICATION  
 1902  
 GS NUMBER THEORY  
 #MULTIPLICATION  
 RT ARITHMETIC  
 COMPUTATION  
 FRINGE MULTIPLICATION

MULTIPLIER PHOTOTUBES

USE PHOTOMULTIPLIER TUBES

MULTIPLIERS  
 0902 1002 1902  
 GS #MULTIPLIERS  
 .CHANNEL MULTIPLIERS  
 RT LAGRANGE MULTIPLIERS  
 LOGIC CIRCUITS  
 PHOTOMULTIPLIER TUBES

MULTIPOLAR FIELDS  
 2304 2307 2402  
 RT CONTINUUM MECHANICS  
 FIELD THEORY (PHYSICS)  
 GRAVITATIONAL FIELDS  
 MAGNETIC FIELDS  
 MULTIPOLES

MULTIPOLES  
 0603 0604 2401 2404 3408  
 RT MONOPOLES  
 MULTIPOLAR FIELDS

MULTIPROCESSING (COMPUTERS)  
 0801 0802  
 GS DATA PROCESSING  
 #MULTIPROCESSING (COMPUTERS)  
 RT ASSOCIATIVE PROCESSING (COMPUTERS)  
 COMPUTERS  
 CONCURRENT PROCESSING  
 CONNECTION MACHINE  
 DATA PROCESSING EQUIPMENT  
 HYPERCUBE MULTIPROCESSORS  
 INTERPROCESSOR COMMUNICATION  
 MULTIPROGRAMMING  
 PARALLEL PROGRAMMING  
 PIPELINING (COMPUTERS)  
 REAL TIME OPERATION  
 SUPERCOMPUTERS  
 TIME SHARING  
 VECTOR PROCESSING (COMPUTERS)

MULTIPROGRAMMING  
 0802 0803  
 UF MULTITASKING (COMPUTERS)  
 GS COMPUTER PROGRAMMING  
 #MULTIPROGRAMMING  
 RT MACHINE-INDEPENDENT PROGRAMS  
 MULTIPLE OUTPUT PROGRAMS  
 MULTIPROCESSING (COMPUTERS)  
 PIPELINING (COMPUTERS)  
 % PROGRAMMING  
 TIME SHARING

MULTIPROPELLANTS

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USE ROCKET PROPELLANTS
MULTIRADAR TRACKING
USE RADAR NETWORKS
MULTISENSOR APPLICATIONS
1409
RT IMAGE PROCESSING
IMAGING TECHNIQUES
PATTERN RECOGNITION
REMOTE SENSING
REMOTE SENSORS

MULTISPECTRAL BAND CAMERAS
1401 1404 1407 1412
GS OPTICAL EQUIPMENT
.CAMERAS
.#MULTISPECTRAL BAND CAMERAS
PHOTOGRAPHIC EQUIPMENT
.CAMERAS
.#MULTISPECTRAL BAND CAMERAS
INFRARED PHOTOGRAPHY
PHOTOGRAPHY

RT

MULTISPECTRAL BAND SCANNERS
0705 0905 1404 1406 1407 1409
GS OPTICAL EQUIPMENT
.OPTICAL SCANNERS
.#MULTISPECTRAL BAND SCANNERS
...THEMATIC MAPPERS (LANDSAT)
SCANNERS
.OPTICAL SCANNERS
.#MULTISPECTRAL BAND SCANNERS
...THEMATIC MAPPERS (LANDSAT)
BAND RATIOING
CHANGE DETECTION
COASTAL ZONE COLOR SCANNER
EARTH OBSERVATIONS (FROM SPACE)
IMAGING TECHNIQUES
INFRARED SCANNERS
OCEAN COLOR SCANNER
PANORAMIC SCANNING
PHOTOGRAPHY
RADIOMETRIC CORRECTION
RADIOMETRIC RESOLUTION
SCANNING
SPACEBORNE PHOTOGRAPHY
SPECTRAL RECONNAISSANCE
VEGETATIVE INDEX

MULTISPECTRAL LINEAR ARRAYS
0906
UF MLA
GS ELECTRONIC EQUIPMENT
.SOLID STATE DEVICES

USE ROCKET PROPELLANTS
MULTIRADAR TRACKING
USE RADAR NETWORKS
MULTISENSOR APPLICATIONS
1409
RT IMAGE PROCESSING
IMAGING TECHNIQUES
PATTERN RECOGNITION
REMOTE SENSING
REMOTE SENSORS

MULTISPECTRAL BAND CAMERAS
1401 1404 1407 1412
GS OPTICAL EQUIPMENT
.CAMERAS
.#MULTISPECTRAL BAND CAMERAS
PHOTOGRAPHIC EQUIPMENT
.CAMERAS
.#MULTISPECTRAL BAND CAMERAS
INFRARED PHOTOGRAPHY
PHOTOGRAPHY

RT

MULTISPECTRAL BAND SCANNERS
0705 0905 1404 1406 1407 1409
GS OPTICAL EQUIPMENT
.OPTICAL SCANNERS
.#MULTISPECTRAL BAND SCANNERS
...THEMATIC MAPPERS (LANDSAT)
SCANNERS
.OPTICAL SCANNERS
.#MULTISPECTRAL BAND SCANNERS
...THEMATIC MAPPERS (LANDSAT)
BAND RATIOING
CHANGE DETECTION
COASTAL ZONE COLOR SCANNER
EARTH OBSERVATIONS (FROM SPACE)
IMAGING TECHNIQUES
INFRARED SCANNERS
OCEAN COLOR SCANNER
PANORAMIC SCANNING
PHOTOGRAPHY
RADIOMETRIC CORRECTION
RADIOMETRIC RESOLUTION
SCANNING
SPACEBORNE PHOTOGRAPHY
SPECTRAL RECONNAISSANCE
VEGETATIVE INDEX

MULTISPECTRAL LINEAR ARRAYS
SPACECRAFT INSTRUMENTS
.SATELLITE INSTRUMENTS
.#MULTISPECTRAL LINEAR ARRAYS
RT % DETECTORS
% SENSORS

MULTISPECTRAL PHOTOGRAPHY
1401 1402 1404 1407
GS PHOTOGRAPHY
#MULTISPECTRAL PHOTOGRAPHY
..INFRARED PHOTOGRAPHY
...COLOR INFRARED PHOTOGRAPHY
..RADAR PHOTOGRAPHY
CHANGE DETECTION
CROP IDENTIFICATION
EARTH OBSERVATIONS (FROM SPACE)
IMAGE RESOLUTION
IMAGERY
IMAGING TECHNIQUES
I2S CAMERAS
SPECTRAL RECONNAISSANCE

MULTISPECTRAL RADAR
0705
UF DUAL FREQUENCY RADAR
MULTIPLE FREQUENCY RADAR
RADAR
#MULTISPECTRAL RADAR
RT IMAGERY
IMAGING TECHNIQUES
SPECTRAL RECONNAISSANCE

MULTISPECTRAL RESOURCE SAMPLER
0705
GS ARTIFICIAL SATELLITES
#MULTISPECTRAL RESOURCE SAMPLER
RT REMOTE SENSING

MULTISPECTRAL TRACKING TELESCOPES
1411 1412 3001
GS TELESCOPES
.SPECTROSCOPIC TELESCOPES
.#MULTISPECTRAL TRACKING TELESCOPES
RT OPTICAL MEASURING INSTRUMENTS
OPTICAL TRACKING
TRACKING (POSITION)

MULTISTAGE COMPRESSORS
USE TURBOCOMPRESSORS

MULTISTAGE ROCKET VEHICLES
3103 3105 3106 3110
GS ROCKET VEHICLES
#MULTISTAGE ROCKET VEHICLES

..ABLESTAR LAUNCH VEHICLE
..ANTARES ROCKET VEHICLE
..ARGO ROCKET VEHICLES
..ARIANE LAUNCH VEHICLE
..ASTROBEE ROCKET VEHICLES
..ASTROBEE 1500 ROCKET VEHICLE
..ATHENA ROCKET VEHICLE
..ATLAS LAUNCH VEHICLES
..ATLAS ABLE 5 LAUNCH VEHICLE
....ATLAS AGENA B LAUNCH VEHICLE
....ATLAS AGENA LAUNCH VEHICLES
....ATLAS CENTAUR LAUNCH VEHICLE
....ATLAS SLV-3 LAUNCH VEHICLE
..BERENICE ROCKET VEHICLE
..BLACK KNIGHT ROCKET VEHICLE
..BLUE SCOUT ROCKET VEHICLE
..DIAMANT LAUNCH VEHICLE
..ELDO LAUNCH VEHICLE
..EXOS SOUNDING ROCKET
..JAGUAR ROCKET VEHICLE
..JAVELIN ROCKET VEHICLE
..JUNO LAUNCH VEHICLES
....JUNO 1 LAUNCH VEHICLE
....JUNO 2 LAUNCH VEHICLE
..JUPITER C ROCKET VEHICLE
..KAPPA ROCKET VEHICLES
....KAPPA 8 ROCKET VEHICLE
....KAPPA 9 ROCKET VEHICLE
..LAMBDA ROCKET VEHICLES
..LITTLE JOE 2 LAUNCH VEHICLE
..NIKE ROCKET VEHICLES
....NIKE-APACHE ROCKET VEHICLE
....NIKE-CAJUN ROCKET VEHICLE
....NIKE-HYDAC ROCKET VEHICLE
....NIKE-IROQUOIS ROCKET VEHICLE
....NIKE-JAVELIN ROCKET VEHICLE
....NIKE-TOMAHAWK ROCKET VEHICLE
..NOVA LAUNCH VEHICLES
..PEGASUS AIR-LAUNCHED BOOSTER
..PHOENIX SOUNDING ROCKET
..RAM B LAUNCH VEHICLE
..RUBIS ROCKET VEHICLE
..SATURN LAUNCH VEHICLES
....SATURN D LAUNCH VEHICLE
....SATURN 1 LAUNCH VEHICLES
......SATURN 1 SA-1 LAUNCH VEHICLE
......SATURN 1 SA-2 LAUNCH VEHICLE
......SATURN 1 SA-3 LAUNCH VEHICLE
......SATURN 1 SA-4 LAUNCH VEHICLE
......SATURN 1 SA-5 LAUNCH VEHICLE
......SATURN 1 SA-6 LAUNCH VEHICLE
......SATURN 1 SA-7 LAUNCH VEHICLE
......SATURN 1 SA-8 LAUNCH VEHICLE
......SATURN 1 SA-9 LAUNCH VEHICLE
......SATURN 1 SA-10 LAUNCH VEHICLE

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# NASA THESAURUS HIERARCHICAL UPDATE

...SATURN 1B LAUNCH VEHICLES  
 ...SATURN 2 LAUNCH VEHICLES  
 ...SATURN 5 LAUNCH VEHICLES  
 ..SCOUT LAUNCH VEHICLE  
 ..SKYLARK ROCKET VEHICLE  
 ..THOR LAUNCH VEHICLES  
 ...THOR ABLE ROCKET VEHICLE  
 ...THOR AGENA LAUNCH VEHICLE  
 ...THOR DELTA LAUNCH VEHICLE  
 ..TITAN LAUNCH VEHICLES  
 ...TITAN 3 LAUNCH VEHICLE  
 ...TITAN 4 LAUNCH VEHICLE  
 ...VANGUARD 2 LAUNCH VEHICLE  
 ..VEGA LAUNCH VEHICLE  
 ..WASP SOUNDING ROCKET  
 RT AIR LAUNCHING  
 EXPENDABLE STAGES (SPACECRAFT)  
 INTERIM STAGES (SPACECRAFT)  
 LAUNCH VEHICLES  
 MINUTEMAN ICBM  
 MULTIENGINE VEHICLES  
 NAVAHO MISSILE  
 PAYLOAD MASS RATIO  
 PERSHING MISSILE  
 PIGGYBACK SYSTEMS  
 POLARIS MISSILES  
 PROPULSIVE EFFICIENCY  
 ROCKET ENGINES  
 SS-11 MISSILE  
 STAGE SEPARATION  
 SUNBLAZER SPACE PROBE  
 TALOS MISSILE  
 TERRIER MISSILE  
 TITAN ICBM  
 TRAILBLAZER 1 REENTRY VEHICLE  
 TRAILBLAZER 2 REENTRY VEHICLE  
 UPPER STAGE ROCKET ENGINES  
 % VEHICLES

MULTISTATIC RADAR  
 O703  
 UF BISTATIC RADAR  
 GS RADAR  
 .DOPPLER RADAR  
 .#MULTISTATIC RADAR  
 .SURVEILLANCE RADAR  
 .#MULTISTATIC RADAR  
 RT MULTIPATH TRANSMISSION  
 PULSE RADAR  
 RADAR DETECTION  
 TARGET RECOGNITION  
 MULTITASKING (COMPUTERS)  
 USE MULTIPROGRAMMING

MULTITEMPORAL ANALYSIS  
 USE TEMPORAL RESOLUTION  
 MULTIVARIABLE CONTROL  
 1003 2102 3406  
 RT % CONTROL  
 CONTROL THEORY  
 FEEDBACK CONTROL  
 OPTIMAL CONTROL  
 MULTIVARIATE STATISTICAL ANALYSIS  
 1902 1905  
 GS STATISTICAL ANALYSIS  
 . VARIANCE (STATISTICS)  
 .#MULTIVARIATE STATISTICAL ANALYSIS  
 ...BIVARIATE ANALYSIS  
 ...COVARIANCE  
 ...REGRESSION ANALYSIS  
 RT % ANALYZING  
 CORRELATION  
 DISCRIMINANT ANALYSIS (STATISTICS)  
 % VARIANCE

MULTIVIBRATORS  
 0801 0902 1201  
 GS CIRCUITS  
 #MULTIVIBRATORS  
 ..FLIP-FLOPS  
 ..MONOSTABLE MULTIVIBRATORS  
 RT AMPLIFIERS  
 BISTABLE CIRCUITS  
 LOGIC CIRCUITS  
 OSCILLATORS  
 POSITIVE FEEDBACK  
 SWITCHING CIRCUITS  
 TRIGGER CIRCUITS

MUON SPIN ROTATION  
 2405  
 GS GYRATION  
 . ROTATION  
 .#MUON SPIN ROTATION  
 RT CHARGED PARTICLES  
 HYPERFINE STRUCTURE  
 MUONS  
 PARTICLE DIFFUSION  
 PARTICLE SPIN  
 PRECESSION

MUONIUM  
 2401 2403  
 RT ELECTRONS  
 MESONS  
 MUONS

2403 2405  
 GS PARTICLES  
 . ELEMENTARY PARTICLES  
 ..BOSONS  
 ...#MUONS  
 ...FERMIONS  
 ...LEPTONS  
 ...#MUONS  
 ..HADRONS  
 ...MESONS  
 ...#MUONS  
 ...NUCLEAR PARTICLES  
 ..BOSONS  
 ...MESONS  
 ...#MUONS  
 BARYONS  
 CHARGED PARTICLES  
 ELECTRON DECAY RATE  
 MUON SPIN ROTATION  
 MURCHISON METEORITE  
 3005  
 GS CELESTIAL BODIES  
 .METEORITES  
 ...STONY METEORITES  
 ...CARBONACEOUS METEORITES  
 ...CARBONACEOUS CHONDRITES  
 ...#MURCHISON METEORITE  
 ...CHONDRITES  
 ...CARBONACEOUS CHONDRITES  
 ...#MURCHISON METEORITE

MURRAY METEORITE  
 3005  
 GS CELESTIAL BODIES  
 .METEORITES  
 ...STONY METEORITES  
 ...CARBONACEOUS METEORITES  
 ...CARBONACEOUS CHONDRITES  
 ...#MURRAY METEORITE  
 ...CHONDRITES  
 ...CARBONACEOUS CHONDRITES  
 ...#MURRAY METEORITE

MUSCLE RELAXANTS  
 0404 0405 0408  
 GS DRUGS  
 #MUSCLE RELAXANTS  
 MUSCLES  
 0403 0404  
 GS ANATOMY  
 .MUSCULOSKELETAL SYSTEM  
 .#MUSCLES

|                        |                          |  |  |  |  |
|------------------------|--------------------------|--|--|--|--|
| ...                    | CONSTRICATORS            |  |  |  |  |
| ...                    | FLEXORS                  |  |  |  |  |
| ...                    | TENDONS                  |  |  |  |  |
| RT                     | ALDOLASE                 |  |  |  |  |
|                        | ATAXIA                   |  |  |  |  |
|                        | CONGENERS                |  |  |  |  |
|                        | CONVULSIONS              |  |  |  |  |
|                        | ELECTROCARDIOGRAPHY      |  |  |  |  |
|                        | FIBRILLATION             |  |  |  |  |
|                        | HEART                    |  |  |  |  |
|                        | HYPODYNAMIA              |  |  |  |  |
|                        | MUSCULAR FATIGUE         |  |  |  |  |
|                        | MUSCULAR STRENGTH        |  |  |  |  |
|                        | MUSCULAR TONUS           |  |  |  |  |
|                        | MYOELECTRIC POTENTIALS   |  |  |  |  |
|                        | MYOELECTRICITY           |  |  |  |  |
|                        | MYOGLOBIN                |  |  |  |  |
|                        | SPASMS                   |  |  |  |  |
|                        | TWITCHING                |  |  |  |  |
| MUSCOVITE              |                          |  |  |  |  |
| 1806                   |                          |  |  |  |  |
| GS                     | ALUMINUM COMPOUNDS       |  |  |  |  |
|                        | #MUSCOVITE               |  |  |  |  |
|                        | CHALCOGENIDES            |  |  |  |  |
|                        | .OXIDES                  |  |  |  |  |
|                        | ..SILICON OXIDES         |  |  |  |  |
|                        | ...#MUSCOVITE            |  |  |  |  |
|                        | MINERALS                 |  |  |  |  |
|                        | .MICA                    |  |  |  |  |
|                        | ..#MUSCOVITE             |  |  |  |  |
|                        | SILICON COMPOUNDS        |  |  |  |  |
|                        | .SILICON OXIDES          |  |  |  |  |
|                        | ..#MUSCOVITE             |  |  |  |  |
| MUSCULAR FATIGUE       |                          |  |  |  |  |
| O401 O408              |                          |  |  |  |  |
| GS                     | FATIGUE (BIOLOGY)        |  |  |  |  |
|                        | #MUSCULAR FATIGUE        |  |  |  |  |
| RT                     | MUSCLES                  |  |  |  |  |
|                        | MUSCULOSKELETAL SYSTEM   |  |  |  |  |
|                        | STRESS (PHYSIOLOGY)      |  |  |  |  |
| MUSCULAR FUNCTION      |                          |  |  |  |  |
| O404 O408              |                          |  |  |  |  |
| GS                     | #MUSCULAR FUNCTION       |  |  |  |  |
|                        | .SPASMS                  |  |  |  |  |
| RT                     | CRAMPS                   |  |  |  |  |
| %                      | FUNCTIONS                |  |  |  |  |
|                        | HYPODYNAMIA              |  |  |  |  |
|                        | HYPOKINESIA              |  |  |  |  |
|                        | HYPOTONIA                |  |  |  |  |
|                        | MECHANOGAMS              |  |  |  |  |
|                        | TWITCHING                |  |  |  |  |
| MUSCULAR STRENGTH      |                          |  |  |  |  |
| O404 O408              |                          |  |  |  |  |
| RT                     | MUSCLES                  |  |  |  |  |
|                        | MUSCULOSKELETAL SYSTEM   |  |  |  |  |
|                        | % STRENGTH               |  |  |  |  |
| MUSCULAR TONUS         |                          |  |  |  |  |
| O404 O405 O408         |                          |  |  |  |  |
| UF                     | TONUS                    |  |  |  |  |
| GS                     | #MUSCULAR TONUS          |  |  |  |  |
|                        | .HYPOTONIA               |  |  |  |  |
| RT                     | EXERCISE PHYSIOLOGY      |  |  |  |  |
|                        | MUSCLES                  |  |  |  |  |
| MUSCULOSKELETAL SYSTEM |                          |  |  |  |  |
| O404 O408              |                          |  |  |  |  |
| UF                     | SKELETON                 |  |  |  |  |
| GS                     | ANATOMY                  |  |  |  |  |
|                        | #MUSCULOSKELETAL SYSTEM  |  |  |  |  |
|                        | ..BONES                  |  |  |  |  |
|                        | ...FEMUR                 |  |  |  |  |
|                        | ...PELVIS                |  |  |  |  |
|                        | ...SCAPULA               |  |  |  |  |
|                        | ...SKULL                 |  |  |  |  |
|                        | ....CRANIUM              |  |  |  |  |
|                        | .....INTRACRANIAL CAVITY |  |  |  |  |
|                        | ....MASTOIDS             |  |  |  |  |
|                        | ...SPINE                 |  |  |  |  |
|                        | ....VERTEBRAE            |  |  |  |  |
|                        | ...STERNUM               |  |  |  |  |
|                        | ...TIBIA                 |  |  |  |  |
|                        | ...ULNA                  |  |  |  |  |
|                        | ..CONNECTIVE TISSUE      |  |  |  |  |
|                        | ...BONE MARROW           |  |  |  |  |
|                        | ...CARTILAGE             |  |  |  |  |
|                        | ...COLLAGENS             |  |  |  |  |
|                        | ..JOINTS (ANATOMY)       |  |  |  |  |
|                        | ...ELBOW (ANATOMY)       |  |  |  |  |
|                        | ...KNEE (ANATOMY)        |  |  |  |  |
|                        | ...WRIST                 |  |  |  |  |
|                        | ..MUSCLES                |  |  |  |  |
|                        | ...CONSTRICATORS         |  |  |  |  |
|                        | ...FLEXORS               |  |  |  |  |
|                        | ...TENDONS               |  |  |  |  |
| RT                     | EXOSKELETONS             |  |  |  |  |
|                        | HYPOKINESIA              |  |  |  |  |
|                        | INTERVERTEBRAL DISKS     |  |  |  |  |
|                        | MUSCULAR FATIGUE         |  |  |  |  |
|                        | MUSCULAR STRENGTH        |  |  |  |  |
|                        | SCIATIC REGION           |  |  |  |  |
|                        | STRIATION                |  |  |  |  |
|                        | % SYSTEMS                |  |  |  |  |
| MUSEUMS                |                          |  |  |  |  |
| 3402 3403              |                          |  |  |  |  |
| RT                     | ANTHROPOLOGY             |  |  |  |  |
|                        | ARTIFACTS                |  |  |  |  |
|                        | BUILDINGS                |  |  |  |  |
|                        | COLLECTION               |  |  |  |  |
|                        | HISTORIES                |  |  |  |  |
|                        | LIBRARIES                |  |  |  |  |
| MUSHY ZONES            |                          |  |  |  |  |
| 1701                   |                          |  |  |  |  |
| UF                     | LIQUID PLUS SOLID ZONES  |  |  |  |  |
| RT                     | CASTING                  |  |  |  |  |
|                        | COOLING                  |  |  |  |  |
|                        | METALLOGRAPHY            |  |  |  |  |
|                        | PHASE TRANSFORMATIONS    |  |  |  |  |
|                        | SOLIDIFICATION           |  |  |  |  |
| MUSIC                  |                          |  |  |  |  |
| O410 O506              |                          |  |  |  |  |
| RT                     | ARTS                     |  |  |  |  |
|                        | OCTAVES                  |  |  |  |  |
| MUSKEGS                |                          |  |  |  |  |
| 1306                   |                          |  |  |  |  |
| GS                     | LANDFORMS                |  |  |  |  |
|                        | #MUSKEGS                 |  |  |  |  |
| RT                     | ARCTIC REGIONS           |  |  |  |  |
|                        | MARSHLANDS               |  |  |  |  |
|                        | SOILS                    |  |  |  |  |
|                        | TOPOGRAPHY               |  |  |  |  |
|                        | WATER                    |  |  |  |  |
| MUSTANG AIRCRAFT       |                          |  |  |  |  |
| USE                    | P-51 AIRCRAFT            |  |  |  |  |
| MUTAGENS               |                          |  |  |  |  |
| O404                   |                          |  |  |  |  |
| RT                     | AIR POLLUTION            |  |  |  |  |
|                        | BIOCHEMISTRY             |  |  |  |  |
|                        | BIOLOGICAL EVOLUTION     |  |  |  |  |
|                        | CELLS (BIOLOGY)          |  |  |  |  |
|                        | CHEMICAL ANALYSIS        |  |  |  |  |
|                        | GENETICS                 |  |  |  |  |
|                        | MUTATIONS                |  |  |  |  |
| MUTATIONS              |                          |  |  |  |  |
| O404 O406 O411         |                          |  |  |  |  |
| RT                     | BIOLOGICAL EVOLUTION     |  |  |  |  |
|                        | CELLS (BIOLOGY)          |  |  |  |  |
|                        | CHROMOSOMES              |  |  |  |  |
|                        | GENES                    |  |  |  |  |
|                        | GENETICS                 |  |  |  |  |
|                        | MITOSIS                  |  |  |  |  |
|                        | MUTAGENS                 |  |  |  |  |
|                        | NUCLEOGENESIS            |  |  |  |  |
|                        | RADIATION HAZARDS        |  |  |  |  |

# NASA THESAURUS HIERARCHICAL UPDATE

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MX MISSILE
3101
GS  MISSILES
    . SURFACE TO SURFACE MISSILES
    .. INTERCONTINENTAL BALLISTIC MISSILES
    .. #MX MISSILE
RT  MISSILE SILOS

MYELIN
O404 O405
RT  FATS
    LIPIDS
    NERVES
    NERVOUS SYSTEM
    NEURONS

MYLAR (TRADEMARK)
1802 1808
GS  POLYMERIC FILMS
    #MYLAR (TRADEMARK)
RT  POLYETHYLENE TEREPHTHALATE
    % POLYMERS

MYOCARDIAL INFARCTION
O404 O405 O408
GS  DISEASES
    . HEART DISEASES
    .. INFARCTION
    ... #MYOCARDIAL INFARCTION
RT  ARTERIOSCLEROSIS
    BLOOD COAGULATION
    CORONARY ARTERY DISEASE
    HYPERTENSION
    THROMBOSIS

MYOCARDIUM
O404 O405
GS  ANATOMY
    . CIRCULATORY SYSTEM
    .. CARDIOVASCULAR SYSTEM
    ... HEART
    .... #MYOCARDIUM
RT  ANGINA PECTORIS

MYOELECTRIC POTENTIALS
O401 O404 O405
GS  MYOELECTRICITY
    #MYOELECTRIC POTENTIALS
RT  MUSCLES
    % POTENTIAL

MYOELECTRICITY
O401 O404 O405
    N-BODY PROBLEM
    USE  MANY BODY PROBLEM

    N-N JUNCTIONS
    O904 O906 2401 2403 2405
    GS  SEMICONDUCTOR JUNCTIONS
        #N-N JUNCTIONS

    N-P JUNCTIONS
    USE  P-N JUNCTIONS

    N-P-N JUNCTIONS
    2602 2603
    GS  SEMICONDUCTOR JUNCTIONS
        #N-P-N JUNCTIONS
    RT  BIPOLAR TRANSISTORS

    N-TYPE SEMICONDUCTORS
    2602 2603
    GS  SEMICONDUCTORS (MATERIALS)
        #N-TYPE SEMICONDUCTORS
    RT  ELECTRONS
        SCHOTTKY DIODES
        SEMICONDUCTOR JUNCTIONS
        SUHL EFFECT

    N-156 AIRCRAFT
    USE  F-5 AIRCRAFT

    NA-300 AIRCRAFT
    USE  OV-10 AIRCRAFT

    NACELLES
    O102 O201 O202
    RT  AERODYNAMIC CONFIGURATIONS
        AIR INTAKES
        AIRFRAMES
        COWLINGS
        DUCTED BODIES
        ENGINE INLETS
        EXTERNAL STORE SEPARATION
        EXTERNAL STORES
        EXTERNAL TANKS
        FAIRINGS
        HOUSINGS
        NOSE INLETS
        PERFORATED SHELLS
        PODS (EXTERNAL STORES)
        PROTUBERANCES
        SHELLS (STRUCTURAL FORMS)
        WING-FUSELAGE STORES

    NAKED SINGULARITIES
    O802 3009

GS  #MYOELECTRICITY
    . MYOELECTRIC POTENTIALS
RT  ELECTROMYOGRAPHY
    MUSCLES

MYOGLOBIN
O403 O404
GS  BIOPOLYMERS
    . PROTEINS
    . #MYOGLOBIN
    ORGANIC COMPOUNDS
    . PROTEINS
    . #MYOGLOBIN
RT  MUSCLES
    PIGMENTS

MYOPIA
O405 O408
RT  VISION

MYSTERE 20 AIRCRAFT
O201 O204
UF  DASSAULT MYSTERE 20 AIRCRAFT
GS  DASSAULT AIRCRAFT
    #MYSTERE 20 AIRCRAFT
    JET AIRCRAFT
    . TURBOFAN AIRCRAFT
    . #MYSTERE 20 AIRCRAFT
    LIGHT AIRCRAFT
    #MYSTERE 20 AIRCRAFT
    MONOPLANES
    #MYSTERE 20 AIRCRAFT
    PASSENGER AIRCRAFT
    #MYSTERE 20 AIRCRAFT
    TRANSPORT AIRCRAFT
    #MYSTERE 20 AIRCRAFT

MYSTERE 50 AIRCRAFT
O102
UF  DASSAULT MYSTERE 50 AIRCRAFT
RT  DASSAULT AIRCRAFT
    JET AIRCRAFT
    LIGHT AIRCRAFT
    PASSENGER AIRCRAFT
    TRANSPORT AIRCRAFT
    TURBOFAN AIRCRAFT

N ELECTRONS
2304 2401 2403
GS  PARTICLES
    . CHARGED PARTICLES
    . . ENERGETIC PARTICLES
    . . . ELECTRONS
    . . . #N ELECTRONS
RT  BETA PARTICLES

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GS ANALYSIS (MATHEMATICS)  
 .COMPLEX VARIABLES  
 ..SINGULARITY (MATHEMATICS)  
 ..#NAKED SINGULARITIES  
 RT ASTROPHYSICS  
 BLACK HOLES (ASTRONOMY)  
 COSMOLOGY  
 DEGENERATE MATTER  
 EVENT HORIZON  
 GRAVITATIONAL COLLAPSE  
 POINTS (MATHEMATICS)  
 RELATIVITY  
 SPACE-TIME FUNCTIONS  
 THEORETICAL PHYSICS  
 WHITE HOLES (ASTRONOMY)  
 NAKHLITES  
 1306 3005  
 GS CELESTIAL BODIES  
 .METEORITES  
 ..STONY METEORITES  
 ...ACHONDRITES  
 ...#NAKHLITES  
 RT CHASSIGNITES  
 SHERGOTTITES  
 NAMC AIRCRAFT  
 USE NIHON AIRCRAFT  
 NAMIBIA  
 3403  
 UF SOUTH WEST AFRICA  
 RT AFRICA  
 NATIONS  
 REPUBLIC OF SOUTH AFRICA  
 NAMING  
 3406 3407  
 GS #NAMING  
 .NORMS  
 RT SPECIFICATIONS  
 STANDARDIZATION  
 NAP-OF-THE-EARTH NAVIGATION  
 1402  
 UF NOE NAVIGATION  
 GS NAVIGATION  
 .AIR NAVIGATION  
 .#NAP-OF-THE-EARTH NAVIGATION  
 RT HELICOPTERS  
 IMAGE PROCESSING  
 LOW ALTITUDE  
 NIGHT FLIGHTS (AIRCRAFT)  
 NIGHT VISION  
 TARGET RECOGNITION

TERRAIN ANALYSIS  
 TERRAIN FOLLOWING AIRCRAFT  
 NAPHTHALENE  
 0603 1808  
 GS ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..CYCLIC HYDROCARBONS  
 ..#NAPHTHALENE  
 .HYDROCARBONS  
 ..CYCLIC HYDROCARBONS  
 ..#NAPHTHALENE  
 NAPHTHENES  
 1808  
 GS ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..CYCLIC HYDROCARBONS  
 ..#NAPHTHENES  
 .HYDROCARBONS  
 ..CYCLIC HYDROCARBONS  
 ..#NAPHTHENES  
 NAPPEES  
 USE FOLDS (GEOLOGY)  
 NARCOLEPSY  
 0405 0408  
 GS DISEASES  
 #NARCOLEPSY  
 NARCOSIS  
 0404 0408  
 GS UNCONSCIOUSNESS  
 #NARCOSIS  
 RT PHYSIOLOGY  
 % POISONING  
 NARCOTICS  
 0404 0405 0408 0603  
 GS DRUGS  
 #NARCOTICS  
 ..MORPHINE  
 RT PENTOBARBITAL  
 PHENOBARBITAL  
 PSYCHOTROPIC DRUGS  
 NARROWBAND  
 0701  
 GS BANDWIDTH  
 #NARROWBAND  
 RT % BANDS  
 BROADBAND  
 FREQUENCIES

NASA COMMUNICATION NETWORK  
 USE NASCOM NETWORK  
 NASA END-TO-END DATA SYSTEM  
 USE NEEDS (DATA SYSTEM)  
 NASA INTERACTIVE PLANNING SYSTEM  
 0802  
 UF NIPS (SYSTEM)  
 RT COMPUTER PROGRAMS  
 EARTH RESOURCES  
 MANAGEMENT METHODS  
 NASA PROGRAMS  
 PROJECT PLANNING  
 RESOURCE ALLOCATION  
 RESOURCES MANAGEMENT  
 % SYSTEMS  
 NASA PROGRAMS  
 3409  
 GS PROGRAMS  
 #NASA PROGRAMS  
 ..ACEE PROGRAM  
 ..ASSESS PROGRAM  
 ..ATLIT PROJECT  
 ..DAST PROGRAM  
 ..NASA SPACE PROGRAMS  
 ..APOLLO APPLICATIONS PROGRAM  
 ..APOLLO PROJECT  
 ...BIOASTRONAUTICAL ORBITAL SPACE  
 SYSTEM  
 ...CENTAUR PROJECT  
 ...EARTH & OCEAN PHYSICS  
 APPLICATIONS PROGRAM  
 ...EARTH RESOURCES PROGRAM  
 ...EARTH RESOURCES SURVEY PROGRAM  
 ....SEASAT PROGRAM  
 ...ECHO PROJECT  
 ...GALILEO PROJECT  
 ...GEMINI PROJECT  
 ...HELIOS PROJECT  
 ...JUPITER PROJECT  
 ...MAGELLAN PROJECT (NASA)  
 ...MARINER PROGRAM  
 ...MARINER VENUS-MERCURY 1973  
 ...MARINER-MERCURY 1973  
 ...MARS 69 PROJECT  
 ...MARS 71 PROJECT  
 ...MERCURY PROJECT  
 ...NATIONAL LAUNCH VEHICLE PROGRAM  
 ...NEW MOONS PROJECT  
 ...NIMBUS PROJECT  
 ...OPEN PROJECT  
 ...PIONEER PROJECT  
 ...PROJECT SETI

# NASA THESAURUS HIERARCHICAL UPDATE

....RANGER PROJECT  
 ....AGENA B RANGER PROGRAM  
 ....ROVER PROJECT  
 ....SAIL PROJECT  
 ....SATURN PROJECT  
 ....SCOUT PROJECT  
 ....SKYLAB PROGRAM  
 ....STARPROBE MISSION  
 ....SURVEYOR PROJECT  
 ....SYNCHRONOUS COMMUNICATIONS  
 SATELLITE PROJ  
 ....TEKTITE PROJECT  
 ....TIROS PROJECT  
 ....TITAN PROJECT  
 ....VANGUARD PROJECT  
 ....VIKING MARS PROGRAM  
 ....VOYAGER PROJECT  
 ..NATIONAL AEROSPACE PLANE PROGRAM  
 ..QUIET ENGINE PROGRAM  
 ..SUPERSONIC CRUISE AIRCRAFT  
 RESEARCH  
 ..TACT PROGRAM  
 ..TERMINAL CONFIGURED VEHICLE  
 PROGRAM  
 ..TILT ROTOR RESEARCH AIRCRAFT  
 PROGRAM  
 ADVANCED LAUNCH SYSTEM (STS)  
 AGRISTARS PROJECT  
 APOLLO EXTENSION SYSTEM  
 CANADIAN SPACE PROGRAM  
 COMMITTEE ON SPACE RESEARCH  
 COMMUNICATIONS TECHNOLOGY SATELLITE  
 DELAYED FLAP APPROACH  
 EARTH RESOURCES INFORMATION SYSTEM  
 GARP ATLANTIC TROPICAL EXPERIMENT  
 GEOGRAPHIC APPLICATIONS PROGRAM  
 GLOBAL ATMOSPHERIC RESEARCH PROGRAM  
 GRANTS  
 GRAVITY PROBE B  
 LANDSAT SATELLITES  
 LEASING  
 NASA INTERACTIVE PLANNING SYSTEM  
 NASTRAN  
 NOESS  
 OSS-1 PAYLOAD  
 PAYLOAD DEPLOYMENT & RETRIEVAL  
 SYSTEM  
 QUASAT  
 QUESTOL AIRCRAFT  
 RESEARCH PROJECTS  
 ROTOR SYSTEMS RESEARCH AIRCRAFT  
 SEASAT SATELLITES  
 SINGLE STAGE TO ORBIT VEHICLES  
 SPACE PROGRAMS  
 SPACE TRANSPORTATION SYSTEM

SPACELAB  
 SPHINX  
 STARSITE PROGRAM  
 STORMSAT SATELLITE  
 SYNCHRONOUS EARTH OBSERVATORY  
 SATELLITE  
 TECHNOLOGY UTILIZATION  
 TRANSIT NAVIGATION SYSTEM  
 UNIVERSITY PROGRAM  
 NASA SPACE PROGRAMS  
 3409 3009  
 GS  
 PROGRAMS  
 .NASA PROGRAMS  
 .#NASA SPACE PROGRAMS  
 ...APOLLO APPLICATIONS PROGRAM  
 ...APOLLO PROJECT  
 ...VOYAGER PROJECT  
 ...BIOASTRONAUTICAL ORBITAL SPACE  
 SYSTEM  
 ...CENTAUR PROJECT  
 ...EARTH & OCEAN PHYSICS  
 APPLICATIONS PROGRAM  
 ...EARTH RESOURCES PROGRAM  
 ...EARTH RESOURCES SURVEY PROGRAM  
 ...SEASAT PROGRAM  
 ...ECHO PROJECT  
 ...GALILEO PROJECT  
 ...GEMINI PROJECT  
 ...HELIOS PROJECT  
 ...JUPITER PROJECT  
 ...MAGELLAN PROJECT (NASA)  
 ...MARINER PROGRAM  
 ...MARINER VENUS-MERCURY 1973  
 ...MARINER-MERCURY 1973  
 ...MARS 69 PROJECT  
 ...MARS 71 PROJECT  
 ...MERCURY PROJECT  
 ...NATIONAL LAUNCH VEHICLE PROGRAM  
 ...NEW MOONS PROJECT  
 ...NIMBUS PROJECT  
 ...OPEN PROJECT  
 ...PIONEER PROJECT  
 ...PROJECT SETI  
 ...RANGER PROJECT  
 ...AGENA B RANGER PROGRAM  
 ...ROVER PROJECT  
 ...SAIL PROJECT  
 ...SATURN PROJECT  
 ...SCOUT PROJECT  
 ...SKYLAB PROGRAM  
 ...STARPROBE MISSION  
 ...SURVEYOR PROJECT  
 ...SYNCHRONOUS COMMUNICATIONS  
 SATELLITE PROJ  
 ...TEKTITE PROJECT  
 ...TIROS PROJECT  
 ...TITAN PROJECT  
 ...VANGUARD PROJECT  
 ...VIKING MARS PROGRAM  
 ...VOYAGER PROJECT  
 ADVANCED LAUNCH SYSTEM (STS)  
 CASSINI MISSION  
 CLUSTER MISSION

RT

COMET RENDEZVOUS ASTEROID FLYBY  
MISSION  
INTERNATIONAL SPACE YEAR  
MANNED MARS MISSIONS  
MARS SAMPLE RETURN MISSIONS  
SPACE STATION FREEDOM

NASA STRUCTURAL ANALYSIS PROGRAM  
USE NASTRAN

NASARR  
USE NORTH AMERICAN SEARCH AND RANGING  
RADAR

NASCOM NETWORK  
O702 O707 O708 O709  
UF NASA COMMUNICATION NETWORK  
GS COMMUNICATING  
.POINT TO POINT COMMUNICATION  
.#NASCOM NETWORK  
COMMUNICATION NETWORKS  
#NASCOM NETWORK  
RT FLEET SATELLITE COMMUNICATION  
SYSTEM

SYSTEM  
GLOBAL TRACKING NETWORK  
% NETWORKS  
RADIO COMMUNICATION  
TELECOMMUNICATION

NASTRAN  
O802  
UF NASA STRUCTURAL ANALYSIS PROGRAM  
GS COMPUTER PROGRAMS  
-APPLICATIONS PROGRAMS (COMPUTERS)  
-NASTRAN

RT  
BENDING MOMENTS  
COMPUTER TECHNIQUES  
DYNAMIC LOADS  
FINITE ELEMENT METHOD  
MATRIX METHODS  
NASA PROGRAMS  
STRESS ANALYSIS  
STRUCTURAL ANALYSIS

NATIONAL AEROSPACE PLANE PROGRAM  
O201 3110  
GS PROGRAMS

RT .NASA PROGRAMS  
#NATIONAL AEROSPACE PLANE PROGRAM  
AEROSPACE PLANES  
HYPERSONIC VEHICLES  
TRANSMOSPHERIC VEHICLES  
X-30 VEHICLE

# NATIONAL AIRSPACE SYSTEM

2102  
RT

AIR TRAFFIC CONTROL  
AIRCRAFT SAFETY  
AIRPORTS  
AIRSPACE  
NATIONAL AIRSPACE UTILIZATION  
SYSTEM  
NATIONAL AVIATION SYSTEM

NATIONAL AIRSPACE UTILIZATION SYSTEM  
2102 2103 3409

AIR LAW  
AIR NAVIGATION  
AIR TRAFFIC  
AIR TRAFFIC CONTROL  
AIRCRAFT APPROACH  
AIRSPACE  
COLLISION AVOIDANCE  
FLIGHT PATHS  
FLIGHT PLANS  
FLIGHT RULES  
NATIONAL AIRSPACE  
SYSTEMS

NATIONAL AVIATION SYSTEM  
Q203 0702 2101  
RT  
AIR TRAFFIC  
AIR TRAFFIC CONTROL  
AIR TRANSPORTATION  
AIRCRAFT APPROACH  
FLIGHT RULES  
LANDING AIDS  
NATIONAL AIRSPACE  
% SYSTEMS  
TRAFFIC CONTROL

NATIONAL LAUNCH VEHICLE PROGRAM  
3102 3103 3409  
GS PROGRAMS

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..NASA PROGRAMS
..NASA SPACE PROGRAMS
..#NATIONAL LAUNCH VEHICLE PROGRAM
..SPACE PROGRAMS
..NASA SPACE PROGRAMS
..#NATIONAL LAUNCH VEHICLE PROGRAM
..LAUNCH VEHICLES

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RT  
LAUNCH VEHICLES  
LAUNCHERS  
LAUNCHING  
LAUNCHING SITES

NATIONAL OCEANIC SATELLITE SYSTEM  
3107  
RT      ARTIFICIAL SATELLITES  
         MARITIME SATELLITES  
         % SYSTEMS

NATIONAL OPERATIONAL ENVIRONMENTAL SAT SYS  
USE NOESS

NATIONAL PARKS  
1305  
GS LAND

...#NATIONAL PARKS  
...YELLOWSTONE NATIONAL PARK  
(ID-MT-WY)

NATIONAL SEVERE STORMS PROJECT  
2001 2003  
RT  
METEOROLOGY  
TORNADOES  
WARNING SYSTEMS

NATIONS  
3403  
GS #1

#NATIONS  
AFGHANISTAN

.AFGHANISTAN  
.ALBANIA  
.ALGERIA  
.ANDORRA  
.ANGOLA  
.ANTIGUA AND BARBUDA

. ARGENTINA

. ARGENTINA  
. ARMENIA

. ARMENIA  
. AUSTRALIA  
. AUSTRALIA

.AUSTRIA  
AZERBAIJAN

. AZERBAIJAN  
. BAHAMAS

.BAHAMAS  
.BAHRAIN

. BANGLADESH  
BARRACKS

.BARBADOS  
.BELARUS

.BELARUS  
.BELGIUM

.BELGIUM  
.BELIZE  
BENTIN

. BENIN  
. BHUTAN

.BHUTAN  
.BOLIVIA

.BOLIVIA  
.BOTSWANA  
BRAZIL

. BRAZIL  
. BRUNEI

.BRUNEI  
.BULGARIA

.BULGARIA  
.BURKINA  
BURMA

.BURMA  
.BURUNDI

.BURUNDI  
.CAMBODIA

. CAMBODIA  
. CAMEROON  
. CANADA

CANADA  
ALBERTA

..ALBERTA  
..BRITISH C

..BRITISH C  
..MANITOBA



# NASA THESAURUS HIERARCHICAL UPDATE

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..NEW BRUNSWICK
..NEWFOUNDLAND
..NORTHWEST TERRITORIES
..NOVA SCOTIA
..ONTARIO
..PRINCE EDWARD ISLAND
..QUEBEC
..SASKATCHEWAN
..YUKON TERRITORY
..CAPE VERDE
..CENTRAL AFRICAN REPUBLIC
..CHAD
..CHILE
..CHINA
..COLOMBIA
..CONGO (BRAZZAVILLE)
..COSTA RICA
..COTE D'IVOIRE
..CUBA
..CYPRUS
..CZECHOSLOVAKIA
..DENMARK
..DJIBOUTI
..DOMINICA
..DOMINICAN REPUBLIC
..EAST GERMANY
..ECUADOR
..EGYPT
..EL SALVADOR
..ETHIOPIA
..FINLAND
..FRANCE
..FRENCH GUIANA
..GUADELOUPE
..MARTINIQUE
..GABON
..GAMBIA
..GEORGIA (EURASIA)
..GHANA
..GREECE
..GRENADA
..GUATEMALA
..GUINEA
..GUYANA
..HAITI
..HONDURAS
..HUNGARY
..ICELAND
..INDIA
..INDONESIA
..IRAN
..IRAQ
..IRELAND
..ISRAEL
..ITALY

..JAMAICA
..JAPAN
..JORDAN
..KAZAKHSTAN
..KENYA
..KUWAIT
..KYRGYZSTAN
..LAOS
..LEBANON
..LESOTHO
..LIBERIA
..LIBYA
..LIECHTENSTEIN
..LUXEMBOURG
..MADAGASCAR
..MALAWI
..MALAYSIA
..MALDIVE ISLANDS
..MALI
..MALTA
..MAURITANIA
..MAURITIUS
..MEXICO
..MOLDAVIA
..MONACO
..MONGOLIA
..MOROCCO
..MOZAMBIQUE
..NEPAL
..NETHERLANDS
..NEW ZEALAND
..NICARAGUA
..NIGER
..NIGERIA
..NORTH KOREA
..NORWAY
..OMAN
..PAKISTAN
..PANAMA
..PAPUA NEW GUINEA
..PARAGUAY
..PERU
..PHILIPPINES
..POLAND
..PORTUGAL
..AZORES
..QATAR
..REPUBLIC OF SOUTH AFRICA
..ROMANIA
..RUSSIAN FEDERATION
..RWANDA
..SAUDI ARABIA
..SENEGAL
..SEYCHELLES

..SIERRA LEONE
..SIKKIM
..SINGAPORE
..SOMALIA
..SOUTH KOREA
..SOUTHERN YEMEN
..SPAIN
..CANARY ISLANDS
..SRI LANKA
..SUDAN
..SURINAM
..SWAZILAND
..SWEDEN
..SWITZERLAND
..SYRIA
..TAIWAN
..TAJIKISTAN
..TANZANIA
..THAILAND
..TIBET
..TOGO
..TRINIDAD AND TOBAGO
..TUNISIA
..TURKEY
..TURKMENISTAN
..U.S.S.R.
..UGANDA
..UKRAINE
..UNITED ARAB EMIRATES
..UNITED KINGDOM
..ENGLAND
..GIBRALTAR
..NORTHERN IRELAND
..SCOTLAND
..WALES
..UNITED STATES
..ALABAMA
..ALASKA
..ARIZONA
..ARKANSAS
..CALIFORNIA
..COLORADO
..CONNECTICUT
..DELAWARE
..FLORIDA
..GEORGIA
..HAWAII
..IDAHO
..ILLINOIS
..INDIANA
..IOWA
..KANSAS
..KENTUCKY
..LOUISIANA
..MAINE

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..MARYLAND  
 ..MASSACHUSETTS  
 ..MICHIGAN  
 ..MINNESOTA  
 ..MISSISSIPPI  
 ..MISSOURI  
 ..MONTANA  
 ..NEBRASKA  
 ..NEVADA  
 ..NEW HAMPSHIRE  
 ..NEW JERSEY  
 ..NEW MEXICO  
 ..NEW YORK  
 ..NORTH CAROLINA  
 ..NORTH DAKOTA  
 ..OHIO  
 ..OKLAHOMA  
 ..OREGON  
 ..PENNSYLVANIA  
 ..RHODE ISLAND  
 ..SOUTH CAROLINA  
 ..SOUTH DAKOTA  
 ..TENNESSEE  
 ..TEXAS  
 ..UTAH  
 ..VERMONT  
 ..VIRGINIA  
 ..WASHINGTON  
 ..WEST VIRGINIA  
 ..WISCONSIN  
 ..WYOMING  
 ..URUGUAY  
 ..UZBEKISTAN  
 ..VATICAN CITY  
 ..VENEZUELA  
 ..VIETNAM  
 ..WEST GERMANY  
 ..YEMEN  
 ..YUGOSLAVIA  
 ..ZAIRE  
 ..ZAMBIA  
 ..ZIMBABWE  
 AFRICA  
 ASIA  
 CITIES  
 COMMONWEALTH OF INDEPENDENT STATES  
 COMMUNITIES  
 DEMOGRAPHY  
 DEVELOPING NATIONS  
 ESTONIA  
 EUROPE  
 FEDERATIONS  
 HONG KONG  
 INTERNATIONAL LAW  
 LATVIA  
 LITHUANIA  
 MINORITIES  
 NAMIBIA  
 POLITICS  
 REGIMES  
 SPANISH SAHARA  
 UNITED NATIONS  
 NATO 3B SATELLITE  
 3107  
 GS  
 ARTIFICIAL SATELLITES  
 .COMMUNICATION SATELLITES  
 ..COMMUNICATIONS TECHNOLOGY  
 SATELLITE  
 ..NATO 3B SATELLITE  
 NATURAL FREQUENCIES  
 USE RESONANT FREQUENCIES  
 NATURAL GAS  
 1802 2702  
 GS  
 FUELS  
 .GASEOUS FUELS  
 .#NATURAL GAS  
 ORGANIC COMPOUNDS  
 .HYDROCARBONS  
 .#NATURAL GAS  
 RESOURCES  
 .EARTH RESOURCES  
 ..FOSSIL FUELS  
 ..#NATURAL GAS  
 LIQUEFIED NATURAL GAS  
 METHANE  
 NATURAL GAS EXPLORATION  
 OIL FIELDS  
 PETROLEUM PRODUCTS  
 NATURAL GAS EXPLORATION  
 1308 1306  
 RT  
 DRILLING  
 METHANE  
 NATURAL GAS  
 OIL EXPLORATION  
 PHOTOGEOLOGY  
 NATURAL LANGUAGE (COMPUTERS)  
 0802  
 GS  
 LANGUAGES  
 .PROGRAMMING LANGUAGES  
 .#NATURAL LANGUAGE (COMPUTERS)  
 RT  
 COMPUTER PROGRAMMING  
 CONTEXT  
 DATA PROCESSING  
 KNOWLEDGE REPRESENTATION  
 NATURAL LANGUAGE PROCESSING  
 0408 0410 3405  
 RT  
 ARTIFICIAL INTELLIGENCE  
 EXPERT SYSTEMS  
 HUMAN-COMPUTER INTERFACE  
 KNOWLEDGE BASED SYSTEMS  
 LINGUISTICS  
 MACHINE TRANSLATION  
 PARSING ALGORITHMS  
 SEMANTICS  
 SYNTAX  
 NATURAL LASERS  
 USE LASERS  
 NATURAL SATELLITES  
 3001 3005 3009  
 SN (EXCLUDES PLANETS)  
 UF  
 MOONS  
 PLANETARY SATELLITES  
 CELESTIAL BODIES  
 #NATURAL SATELLITES  
 ..CHARON  
 ..ICY SATELLITES  
 ...ARIEL  
 ...CALLISTO  
 ...DIONE  
 ...ENCELADUS  
 ...EUROPA  
 ...GANYMEDE  
 ...HYPERION  
 ...IAPETUS  
 ...MIMAS  
 ...RHEA (ASTRONOMY)  
 ...TETHYS  
 ...TITANIA  
 ..JUPITER SATELLITES  
 ..AMALTHEA  
 ...GALILEAN SATELLITES  
 ....CALLISTO  
 ....EUROPA  
 ....GANYMEDE  
 ....IO  
 ..MARS SATELLITES  
 ...DEIMOS  
 ...PHOBOS  
 ..MOON  
 ..NEPTUNE SATELLITES  
 ...NEREID  
 ...TRITON  
 ..SATURN SATELLITES  
 ...DIONE  
 ...ENCELADUS  
 ...HYPERION  
 ...IAPETUS

# NASA THESAURUS HIERARCHICAL UPDATE

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...JANUS
...MIMAS
...PHOEBE
...RHEA (ASTRONOMY)
...TETHYS
...TITAN
..URANUS SATELLITES
...ARIEL
...MIRANDA
...OBERON
...TITANIA
...UMBRIEL
RT  ARTIFICIAL SATELLITES
CYRILLID METEORIODS
EARTH-MOON SYSTEM
METEORIODS
MOONLETS
PLANETS
ROCHE LIMIT
SATELLITE ATMOSPHERES
SATELLITE SURFACES
% SATELLITES
SATURN RINGS
SOLAR SYSTEM
TEKTITES
URANUS RINGS

NAUSEA
O401
GS  SIGNS AND SYMPTOMS
#NAUSEA
RT  ANTIEMETICS AND ANTINAUSEANTS
MOTION SICKNESS
VOMITING

NAUTICAL CHARTS
1902
GS  CHARTS
#NAUTICAL CHARTS
RT  NAVIGATION AIDS
NAVIGATION SATELLITES
SURFACE NAVIGATION

NAVAHO MISSILE
3101 3401
GS  MISSILES
.RAMJET MISSILES
.#NAVAHO MISSILE
.SURFACE TO SURFACE MISSILES
..CRUISE MISSILES
..#NAVAHO MISSILE
RT  LIQUID PROPELLANT ROCKET ENGINES
MULTISTAGE ROCKET VEHICLES
RAMJET ENGINES

NAVIER-STOKES EQUATION
1201 1202 1902
GS  EQUATIONS OF MOTION
#NAVIER-STOKES EQUATION
FLOW EQUATIONS
#NAVIER-STOKES EQUATION
RT  BURGER EQUATION
COMPUTATIONAL FLUID DYNAMICS
% EQUATIONS
FLOW THEORY
INCOMPRESSIBLE FLOW
INCOMPRESSIBLE FLUIDS
MILNE-THOMSON METHOD
NEWTONIAN FLUIDS
OSEN APPROXIMATION
REYNOLDS EQUATION
REYNOLDS STRESS
VISCIOUS FLOW
VISCIOUS FLUIDS

NAVIGATION
2103
GS  #NAVIGATION
.AIR NAVIGATION
..ALL-WEATHER AIR NAVIGATION
..AREA NAVIGATION
..NAP-OF-THE-EARTH NAVIGATION
..CELESTIAL NAVIGATION
..ASTROGUIDE NAVIGATION SYSTEM
..ASTRONAVIGATION
..DEAD RECKONING
..DIGITAL NAVIGATION
..DOPPLER NAVIGATION
..HYBRID NAVIGATION SYSTEMS
..INERTIAL NAVIGATION
..ASTROGUIDE NAVIGATION SYSTEM
..GIMBALLESS INERTIAL NAVIGATION
..OMEGA NAVIGATION SYSTEM
..POLAR NAVIGATION
..RADAR NAVIGATION
..RADIO NAVIGATION
..HYPERBOLIC NAVIGATION
..DECCA NAVIGATION
..LORAN
...LORAN C
...LORAN D
...SHORAN
..TACAN
..VHF OMNIRANGE NAVIGATION
..SPACE NAVIGATION
..INTERPLANETARY NAVIGATION
..SURFACE NAVIGATION
RT  AUTOMATIC FLIGHT CONTROL
AZIMUTH

NAVIGATION AIDS
2002 2003 2101 2103 2104
GS  #NAVIGATION AIDS
.BEACONS
..AIRPORT BEACONS
..DISCRETE ADDRESS BEACON SYSTEM
..RADAR BEACONS
..DISCRETE ADDRESS BEACON SYSTEM
..RADIO BEACONS
...OMNIDIRECTIONAL RADIO RANGES
...SELF CALIBRATING OMNIRANGE
..RADIO DIRECTION FINDERS
..LIGHT AIRBORNE MULTIPURPOSE SYSTEM
..MICROWAVE SCANNING BEAM LANDING
SYSTEM
.NAVIGATION INSTRUMENTS
..ATTITUDE INDICATORS
...GYRO HORIZONS
..COMPASSES
...GYROCOMPASSES
...MAGNETIC COMPASSES
...SOLAR COMPASSES
..RADIO DIRECTION FINDERS
.TERCOM
RT  % AIDS
AIR NAVIGATION
AIR TRAFFIC CONTROL
AIRCRAFT EQUIPMENT
AIRCRAFT INSTRUMENTS
AIRCRAFT SAFETY
AIRPORTS
ALL-WEATHER AIR NAVIGATION

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|                                |                                    |                                    |
|--------------------------------|------------------------------------|------------------------------------|
| ALTIMETERS                     | ..COMPASSES                        | NAVIGATION TECHNOLOGY SATELLITES   |
| APPROACH INDICATORS            | ...GYROCOMPASSES                   | 1307                               |
| AUTOMATIC FLIGHT CONTROL       | ...MAGNETIC COMPASSES              | UF NTS                             |
| AUTOMATIC PILOTS               | ...SOLAR COMPASSES                 | GS                                 |
| AUTOMATIC TRAFFIC ADVISORY AND | ..RADIO DIRECTION FINDERS          | ARTIFICIAL SATELLITES              |
| RESOLUTION                     | AIRCRAFT EQUIPMENT                 | .NAVIGATION SATELLITES             |
| AUTONOMOUS NAVIGATION          | AIRCRAFT INSTRUMENTS               | ..NAVIGATION TECHNOLOGY SATELLITES |
| BUOYS                          | ALTIMETERS                         | RT NAVSTAR SATELLITES              |
| CHARTS                         | AUTONOMOUS NAVIGATION              |                                    |
| DECCA NAVIGATION               | BORESIGHT ERROR                    | NAVIGATORS                         |
| DISPLAY DEVICES                | FLIGHT CONTROL                     | O502 2103                          |
| DISTANCE MEASURING EQUIPMENT   | FLIGHT INSTRUMENTS                 | GS PERSONNEL                       |
| ECHO SOUNDING                  | GIMBALLESS INERTIAL NAVIGATION     | #NAVIGATORS                        |
| FLIGHT CONTROL                 | HORIZON SCANNERS                   | RT FLIGHT CREWS                    |
| FLIGHT MANAGEMENT SYSTEMS      | HYBRID NAVIGATION SYSTEMS          | FLYING PERSONNEL                   |
| FLIGHT PATHS                   | INERTIAL PLATFORMS                 |                                    |
| GYROSTABILIZERS                | % INSTRUMENTS                      | NAVION AIRCRAFT                    |
| HEAD-UP DISPLAYS               | KALMAN-SCHMIDT FILTERING           | O201 0204                          |
| HELIPORTS                      | LASER RANGE FINDERS                | GS #NAVION AIRCRAFT                |
| HOMING DEVICES                 | LIGHT AIRBORNE MULTIPURPOSE SYSTEM | .G-1 AIRCRAFT                      |
| HYBRID NAVIGATION SYSTEMS      | LORAC NAVIGATION SYSTEM            | RT % AIRCRAFT                      |
| INERTIAL NAVIGATION            | LORAN                              | NAVION G-1 AIRCRAFT                |
| KALMAN FILTERS                 | MEASURING INSTRUMENTS              | USE G-1 AIRCRAFT                   |
| LANDING AIDS                   | POSITION INDICATORS                | NAVION RANGEMASTER AIRCRAFT        |
| LASER RANGE FINDERS            | RADAR                              | USE G-1 AIRCRAFT                   |
| LORAC NAVIGATION SYSTEM        | SOLAR SENSORS                      |                                    |
| LORAN                          | STAR TRACKERS                      |                                    |
| LORAN C                        | TERCOM                             |                                    |
| LORAN D                        |                                    |                                    |
| MAPS                           |                                    | NAVSTAR SATELLITES                 |
| % MARS                         |                                    | 2104 3107                          |
| MILITARY AIR FACILITIES        | NAVIGATION SATELLITES              | GS                                 |
| NAUTICAL CHARTS                | ARTIFICIAL SATELLITES              | ARTIFICIAL SATELLITES              |
| PLOTTERS                       | #NAVIGATION SATELLITES             | .NAVIGATION SATELLITES             |
| POSITION INDICATORS            | ..AEROSAT SATELLITES               | ..NAVSTAR SATELLITES               |
| RADIO NAVIGATION               | ..EXPLORER 22 SATELLITE            | RT ACTIVE SATELLITES               |
| RANGE FINDERS                  | ..NAVIGATION TECHNOLOGY SATELLITES | ATS                                |
| REDUCED ORDER FILTERS          | ..NOVA SATELLITES                  | GEODETIC SATELLITES                |
| REFERENCE STARS                | ..REFSAT                           | NAVIGATION TECHNOLOGY SATELLITES   |
| SEXTANTS                       | ..TRANSIT ATTITUDE CONTROL         | REFSAT                             |
| SHORAN                         | SATELLITE                          | SATELLITE NETWORKS                 |
| SOLAR SENSORS                  | ..TRANSIT SATELLITES               |                                    |
| SONAR                          | ACTIVE SATELLITES                  | NAVY                               |
| STAR TRACKERS                  | ATS                                | 3401                               |
| SURFACE NAVIGATION             | GEODETIC SATELLITES                | GS                                 |
| TACAN                          | LOCATES SYSTEM                     | ARMED FORCES                       |
| VHF OMNIRANGE NAVIGATION       | METEOROLOGICAL SATELLITES          | #NAVY                              |
| WEATHER                        | MILITARY SPACECRAFT                | RT                                 |
|                                | NAUTICAL CHARTS                    | AIRCRAFT CARRIERS                  |
|                                | PASSIVE SATELLITES                 | BALLISTIC MISSILE SUBMARINES       |
|                                | SATELLITE NAVIGATION SYSTEMS       | FLEET SATELLITE COMMUNICATION      |
|                                | SATELLITE NETWORKS                 | SYSTEM                             |
|                                | SYNCHRONOUS SATELLITES             | NUCLEAR POWERED SHIPS              |
|                                | TRANSIT NAVIGATION SYSTEM          | SHIPS                              |
|                                |                                    | SUBMARINES                         |
|                                |                                    | TRIDENT SUBMARINE                  |
|                                |                                    | % VESSELS                          |
|                                |                                    | NC-130 AIRCRAFT                    |
|                                |                                    | USE C-130 AIRCRAFT                 |

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

PHOTOELECTRIC EMISSION  
 SEMICONDUCTORS (MATERIALS)  
 NEGATIVE FEEDBACK  
 1001 1003 2304  
 UF DEGENERATIVE FEEDBACK  
 GS FEEDBACK  
 #NEGATIVE FEEDBACK  
 AUTOMATIC CONTROL  
 DAMPING  
 DEGENERATION  
 FEEDBACK CONTROL  
 NONLINEAR FEEDBACK  
 OSCILLATORS  
 TRANSFER FUNCTIONS  
 NEGATIVE IONS  
 0603  
 GS IONS  
 #NEGATIVE IONS  
 ..ANIONS  
 RT FREE RADICALS  
 IONIC MOBILITY  
 NITROGEN IONS  
 OXYGEN IONS  
 PLASMA PHYSICS  
 NEGATIVE MATTER  
 2311 3408  
 SN (NOT ANTIMATTER)  
 GS MATTER (PHYSICS)  
 #NEGATIVE MATTER  
 RT ANTIMATTER  
 CONDENSED MATTER PHYSICS  
 EXTRATERRESTRIAL MATTER  
 MASS  
 NEGATIVE MATTER PROPULSION  
 2311 2802  
 GS PROPULSION  
 .SPACECRAFT PROPULSION  
 .#NEGATIVE MATTER PROPULSION  
 INTERPLANETARY FLIGHT  
 INTERSTELLAR TRAVEL  
 MATTER-ANTIMATTER PROPULSION  
 ROCKET ENGINES  
 NEGATIVE RESISTANCE CIRCUITS  
 0906 1001  
 GS CIRCUITS  
 #NEGATIVE RESISTANCE CIRCUITS  
 RT % RESISTANCE  
 TUNNEL DIODES  
 NEGATIVE RESISTANCE DEVICES  
 0906 1001  
 RT ALUMINUM GALLIUM ARSENIDES  
 GALLIUM ARSENIDES  
 GUNN DIODES  
 GUNN EFFECT  
 MIM DIODES  
 NEGATONS  
 PARAMETRIC AMPLIFIERS  
 RAMSAUER EFFECT  
 % RESISTANCE  
 RESONANT TUNNELING  
 NEGATONS  
 2304 2403  
 GS PARTICLES  
 .CHARGED PARTICLES  
 ..ENERGETIC PARTICLES  
 ...ELECTRONS  
 ...#NEGATONS  
 RT NEGATIVE RESISTANCE DEVICES  
 NEMBUTAL (TRADEMARK)  
 0405 0408 1808  
 GS DRUGS  
 #NEMBUTAL (TRADEMARK)  
 KETONES  
 #NEMBUTAL (TRADEMARK)  
 SODIUM COMPOUNDS  
 #NEMBUTAL (TRADEMARK)  
 RT PENTOBARBITAL SODIUM  
 NEMESIS (STAR)  
 1308 3009  
 UF SOLAR COMPANION STAR  
 GS CELESTIAL BODIES  
 .STARS  
 ..DOUBLE STARS  
 ...BINARY STARS  
 ....COMPANION STARS  
 ....#NEMESIS (STAR)  
 RT DWARF STARS  
 EXTINCTION  
 DORT CLOUD  
 SOLAR NEIGHBORHOOD  
 STELLAR ORBITS  
 STELLAR SYSTEMS  
 NEODYMIUM  
 0603 1703  
 GS CHEMICAL ELEMENTS  
 .RARE EARTH ELEMENTS  
 .#NEODYMIUM  
 METALS  
 .RARE EARTH ELEMENTS  
 .#NEODYMIUM  
 PHOTOELECTRIC EMISSION  
 SEMICONDUCTORS (MATERIALS)  
 NEGATIVE FEEDBACK  
 1001 1003 2304  
 UF DEGENERATIVE FEEDBACK  
 GS FEEDBACK  
 #NEGATIVE FEEDBACK  
 AUTOMATIC CONTROL  
 DAMPING  
 DEGENERATION  
 FEEDBACK CONTROL  
 NONLINEAR FEEDBACK  
 OSCILLATORS  
 TRANSFER FUNCTIONS  
 NEGATIVE IONS  
 0603  
 GS IONS  
 #NEGATIVE IONS  
 ..ANIONS  
 RT FREE RADICALS  
 IONIC MOBILITY  
 NITROGEN IONS  
 OXYGEN IONS  
 PLASMA PHYSICS  
 NEGATIVE MATTER  
 2311 3408  
 SN (NOT ANTIMATTER)  
 GS MATTER (PHYSICS)  
 #NEGATIVE MATTER  
 RT ANTIMATTER  
 CONDENSED MATTER PHYSICS  
 EXTRATERRESTRIAL MATTER  
 MASS  
 NEGATIVE MATTER PROPULSION  
 2311 2802  
 GS PROPULSION  
 .SPACECRAFT PROPULSION  
 .#NEGATIVE MATTER PROPULSION  
 INTERPLANETARY FLIGHT  
 INTERSTELLAR TRAVEL  
 MATTER-ANTIMATTER PROPULSION  
 ROCKET ENGINES  
 NEGATIVE RESISTANCE CIRCUITS  
 0906 1001  
 GS CIRCUITS  
 #NEGATIVE RESISTANCE CIRCUITS  
 RT % RESISTANCE  
 TUNNEL DIODES  
 NEGATIVE RESISTANCE DEVICES  
 0906 1001  
 RT DIDYMIUM  
 NEODYMIUM ALLOYS  
 1701  
 GS ALLOYS  
 .RARE EARTH ALLOYS  
 .#NEODYMIUM ALLOYS  
 NEODYMIUM COMPOUNDS  
 0601 0603 1704  
 GS RARE EARTH COMPOUNDS  
 #NEODYMIUM COMPOUNDS  
 RT % CHEMICAL COMPOUNDS  
 % METAL COMPOUNDS  
 NEODYMIUM ISOTOPES  
 0603 1703 2406  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 .ISOTOPES  
 ..#NEODYMIUM ISOTOPES  
 .RARE EARTH ELEMENTS  
 .#NEODYMIUM ISOTOPES  
 METALS  
 .RARE EARTH ELEMENTS  
 .#NEODYMIUM ISOTOPES  
 NEODYMIUM LASERS  
 1601  
 GS STIMULATED EMISSION DEVICES  
 .LASERS  
 .#NEODYMIUM LASERS  
 RT COHERENT LIGHT  
 GLASS LASERS  
 OPTICAL PUMPING  
 RARE EARTH ELEMENTS  
 NEON  
 1807  
 0603  
 GS CHEMICAL ELEMENTS  
 .RARE GASES  
 .#NEON  
 ...LIQUID NEON  
 ...NEON ISOTOPES  
 GASES  
 .RARE GASES  
 .#NEON  
 ...LIQUID NEON  
 ...NEON ISOTOPES  
 NEON ISOTOPES  
 0603 1807  
 UF NEON 19  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES

# NASA THESAURUS HIERARCHICAL UPDATE

```

..ISOTOPES
..#NEON ISOTOPES
..RARE GASES
..NEON
..#NEON ISOTOPES
GASES
..RARE GASES
..NEON
..#NEON ISOTOPES

NEON 19
USE NEON ISOTOPES

NEOPENTANE
1808
GS ORGANIC COMPOUNDS
.HYDROCARBONS
..ALIPHATIC HYDROCARBONS
...ALKANES
...PENTANES
....#NEOPENTANE

NEOPLASMS
0404 0405
GS DISEASES
.TUMORS
..NEOPLASMS
...CANCER
...LEUKEMIAS
RT CARCINOGENS
CYSTS

NEOPRENES
USE CHLOROPRENE RESINS

NEPAL
1305
GS NATIONS
#NEPAL
RT ASIA

NEPHALYSIS
1407 2001 2003
RT ALPINE METEOROLOGY
ANVIL CLOUDS
ATMOSPHERIC CLOUD PHYSICS LAB
(SPACELAB)
CAP CLOUDS
CHEMICAL ANALYSIS
CIRROCUMULUS CLOUDS
CIRROSTRATUS CLOUDS
CLOUD COVER
CLOUD PHYSICS
CLOUDS (METEOROLOGY)
CONVECTION CLOUDS

METEOROLOGICAL INSTRUMENTS
METEOROLOGY
NEPHELOMETERS
PRECIPITATION (METEOROLOGY)
SYNOPTIC MEASUREMENT
SYNOPTIC METEOROLOGY
WEATHER FORECASTING

NEPHELINE
1804 1806
GS ALUMINUM COMPOUNDS
#NEPHELINE
MINERALS
#NEPHELINE
POTASSIUM COMPOUNDS
#NEPHELINE
SILICON COMPOUNDS
..SILICATES
.#NEPHELINE
SODIUM COMPOUNDS
#NEPHELINE
RT NEPHELITE

NEPHELITE
1806
GS ALUMINUM COMPOUNDS
#NEPHELITE
CHALCOGENIDES
.OXIDES
..SILICON OXIDES
..#NEPHELITE
MINERALS
#NEPHELITE
SILICON COMPOUNDS
.SILICON OXIDES
.#NEPHELITE
RT NEPHELINE

NEPHELOMETERS
1406 2002 2003 2306 2310
GS MEASURING INSTRUMENTS
.OPTICAL MEASURING INSTRUMENTS
.#NEPHELOMETERS
OPTICAL EQUIPMENT
.OPTICAL MEASURING INSTRUMENTS
.#NEPHELOMETERS
RT NEPHANALYSIS
OPTICAL MEASUREMENT
PHOTOMETERS

NEPHRITIS
0405 0408
GS DISEASES
.KIDNEY DISEASES
.#NEPHRITIS

RT BACTERIAL DISEASES

NEPTUNE (PLANET)
3001 3008 3009
GS CELESTIAL BODIES
.PLANETS
..GAS GIANT PLANETS
..#NEPTUNE (PLANET)
NEPTUNE ATMOSPHERE
NEPTUNE SATELLITES
NEREID
TRITON
VOYAGER 2 SPACECRAFT

RT
NEPTUNE ATMOSPHERE
3001
GS ENVIRONMENTS
..EXTRATERRESTRIAL ENVIRONMENTS
..PLANETARY ENVIRONMENTS
...PLANETARY ATMOSPHERES
...#NEPTUNE ATMOSPHERE
RT AEROSPACE ENVIRONMENTS
% ATMOSPHERES
GAS GIANT PLANETS
HYDROGEN
METHANE
NEPTUNE (PLANET)
PLANETARY IONOSPHERES
TRITON

NEPTUNE SATELLITES
3001 3005 3009
GS CELESTIAL BODIES
.NATURAL SATELLITES
.#NEPTUNE SATELLITES
...NEREID
...TRITON
RT NEPTUNE (PLANET)

NEPTUNIUM
0603 1807
GS CHEMICAL ELEMENTS
.ACTINIDE SERIES
..TRANSURANIUM ELEMENTS
...#NEPTUNIUM
...#NEPTUNIUM ISOTOPES
..NUCLIDES
..ISOTOPES
...RADIOACTIVE ISOTOPES
...TRANSURANIUM ELEMENTS
...#NEPTUNIUM
...#NEPTUNIUM ISOTOPES
METALS
.ACTINIDE SERIES
..TRANSURANIUM ELEMENTS

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[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

## SUPERPOSITION (MATHEMATICS)

NETWORK CONTROL  
1901  
RT COMMUNICATION NETWORKS  
COMMUNICATION SATELLITES  
COMPUTER NETWORKS  
% CONTROL  
LOCAL AREA NETWORKS  
PACKET SWITCHING  
SATELLITE NETWORKS  
TRANSMISSION EFFICIENCY

## NETWORK SYNTHESIS

1001 2304  
UF TELLEGEN THEORY  
RT COMMUNICATION THEORY  
EQUIVALENT CIRCUITS  
HYDRAULIC EQUIPMENT  
KIRCHHOFF LAW OF NETWORKS  
LC CIRCUITS  
% NETWORKS  
RC CIRCUITS  
RICHARDS THEOREM  
RL CIRCUITS  
RLC CIRCUITS  
SUPERPOSITION (MATHEMATICS)  
SWITCHING THEORY  
% SYNTHESIS  
TOPOLOGY

## % NETWORKS

0404 0702 0703 0802 0902 1102  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT ARPA COMPUTER NETWORK  
BOND GRAPHS  
CIRCUITS  
COMPUTER NETWORKS  
COUPLING CIRCUITS  
DEEP SPACE NETWORK  
DIFFERENTIATORS  
ELECTRIC NETWORKS  
ELECTRIC POWER TRANSMISSION  
GRAPHS (CHARTS)  
GRATORS  
HYDRAULIC EQUIPMENT  
INTEGRATORS  
INTERNETS  
MAGNETIC CIRCUITS  
MANNED SPACE FLIGHT NETWORK  
MOSAICS  
NASCOM NETWORK  
NETS

NETWORK ANALYSIS  
NETWORK SYNTHESIS  
NEURAL NETS  
PNEUMATIC EQUIPMENT  
QUADRUPOLE NETWORKS  
RADAR NETWORKS  
SATELLITE NETWORKS  
SIGNAL FLOW GRAPHS  
TOPOLOGY  
TRACKING NETWORKS  
TRANSMISSION LINES  
TRANSPORTATION NETWORKS  
UNDERGROUND TRANSMISSION LINES

## NEUMANN PROBLEM

1902  
GS ANALYSIS (MATHEMATICS)  
.REAL VARIABLES  
.#NEUMANN PROBLEM  
BOUNDARY VALUE PROBLEMS  
#NEUMANN PROBLEM  
RT DIFFERENTIAL EQUATIONS  
PARTIAL DIFFERENTIAL EQUATIONS  
% PROBLEMS

## NEURAL NETS

0404 0408 0503  
GS NETS  
#NEURAL NETS  
RT CYBERNETICS  
GENETIC ALGORITHMS  
LOGIC CIRCUITS  
% NETWORKS

## NEURASTHENIA

0401 0405 0408  
GS DISEASES  
#NEURASTHENIA  
RT NERVOUS SYSTEM

## NEURISTORS

0503 0906 2603  
GS ELECTRONIC EQUIPMENT  
.SOLID STATE DEVICES  
.SEMICONDUCTOR DEVICES  
.#NEURISTORS  
RT BIONICS

## NEURITIS

0405 0408  
GS DISEASES  
#NEURITIS  
RT NERVES  
NERVOUS SYSTEM

NEUROBLASTS  
0404 0405  
GS CELLS (BIOLOGY)  
.NEURONS  
.#NEUROBLASTS  
RT EMBRYOLOGY

## NEUROGLIA

0404 0405  
GS TISSUES (BIOLOGY)  
#NEUROGLIA  
RT BRAIN  
CELLS (BIOLOGY)  
GANGLIA  
NERVOUS SYSTEM  
SPINAL CORD

## NEUROLOGY

0401 0404 0405  
UF NEUROSCIENCE  
GS MEDICAL SCIENCE  
#NEUROLOGY  
RT BRAIN  
CHEMICAL DEFENSE  
ELECTROPHYSIOLOGY  
LIFE SCIENCES  
NEUROPSYCHIATRY  
THRESHOLDS (PERCEPTION)

## NEUROMUSCULAR TRANSMISSION

0404  
RT BIOELECTRICITY  
CHOLINESTERASE  
NEUROTRANSMITTERS  
PERIPHERAL NERVOUS SYSTEM  
SYNAPSES

NEURON TRANSMISSION  
USE BIOELECTRICITY

## NEURONS

0404 0408  
GS CELLS (BIOLOGY)  
#NEURONS  
.AXONS  
.#NEUROBLASTS  
RT BLOOD-BRAIN BARRIER  
MYELIN  
NERVES  
NERVOUS SYSTEM  
SYNAPSES  
SYNCODERS

NEUROPHYSIOLOGY  
0404 0408

GS PHYSIOLOGY  
RT #NEUROPHYSIOLOGY  
GANGLIA  
INFORMATION PROCESSING (BIOLOGY)

0405 0408  
GS TROPISM  
#NEUROTROPISM

NEUTRAL ATMOSPHERES  
1301  
RT % ATMOSPHERES  
NEUTRAL GASES

[illegible]NEUROSCIENCE  
USE NEUROLOGY

NEUROSES  
O408 O410  
GS #NEUROSES  
-NEUROTIC DEPRESSION  
RT FEAR  
FEAR OF FLYING  
PSYCHOSES

NEUROSPORA  
O404 O409  
GS PLANTS (BOTANY)  
. FUNGI  
. #NEUROSPORA  
RT GENETICS

NEUROTIC DEPRESSION  
O408 O410  
G5 NEUROSES  
#NEUROTIC DEPRESSION  
RT % DEPRESSION  
PSYCHOTIC DEPRESSION

NEUROTRANSMITTERS  
O404  
RT  
AXONS  
CATECHOLAMINE  
CELLS (BIOLOGY)  
NERVOUS SYSTEM  
NEUROMUSCULAR TRANSMISSION  
SYNAPSES

## NEUROTROPISM

NEUTRAL CURRENTS  
O102  
RT  
CURRENT DISTRIBUTION  
GRAVITATIONAL COLLAPSE  
NEUTRAL PARTICLES  
NEUTRINOS  
NEUTRON STARS

```

NEUTRAL BUOYANCY SIMULATION
1202 1203 1204
GS ENVIRONMENTAL TESTS
   .UNDERWATER TESTS
     .#NEUTRAL BUOYANCY SIMULATION
       SIMULATION
     .ENVIRONMENT SIMULATION
     ..SPACE ENVIRONMENT SIMULATION
     ...WEIGHTLESSNESS SIMULATION
       ...#NEUTRAL BUOYANCY SIMULATION
         BUOYANCY
RT SPACE SIMULATORS
   WEIGHTLESSNESS

```

```

NEUTRAL BEAMS
2403 2405
GS BEAMS (RADIATION)
.PARTICLE BEAMS
.#NEUTRAL BEAMS
...MOLECULAR BEAM
...NEUTRON BEAMS
RT ATOMIC BEAMS
BEAM INJECTION
BEAM NEUTRALIZATI
NEUTRAL ATOMS
PARTICLES
PION BEAMS

```

NEUTRALIZERS  
O603 1504 1703 1805  
RT ADDITIVES  
% AGENTS  
BUFFERS (CHEMISTRY)  
DISCHARGERS  
INHIBITORS  
PRESERVATIVES  
RETARDANTS  
STABILIZERS (AGENTS)  
SUPPRESSORS

NEUTRINO BEAMS  
2401  
GS BEAMS (RADIATION)

# NASA THESAURUS HIERARCHICAL UPDATE

.PARTICLE BEAMS  
 .#NEUTRINO BEAMS

NEUTRINOS  
 2403 2405 3009  
 GS PARTICLES  
 .ELEMENTARY PARTICLES  
 .FERMIONS  
 ...LEPTONS  
 ...#NEUTRINOS  
 .....SOLAR NEUTRINOS  
 ANTINEUTRINOS  
 DARK MATTER  
 GRAVITINOS  
 NEUTRAL CURRENTS

NEUTRON ABSORBERS  
 2202 2403 2405  
 RT ABSORBERS (MATERIALS)  
 CONTROL RODS  
 MODERATORS  
 POISONING (REACTION INHIBITION)  
 RADIATION ABSORPTION  
 RADIATION SHIELDING

NEUTRON ACTIVATION ANALYSIS  
 2403 2405  
 GS ACTIVATION ANALYSIS  
 #NEUTRON ACTIVATION ANALYSIS  
 CHEMICAL TESTS  
 .CHEMICAL ANALYSIS  
 .#NEUTRON ACTIVATION ANALYSIS  
 MASS SPECTROMETERS  
 MICROANALYSIS  
 QUALITATIVE ANALYSIS  
 QUANTITATIVE ANALYSIS  
 SPECTROSCOPIC ANALYSIS

NEUTRON BEAMS  
 2403 2405  
 GS BEAMS (RADIATION)  
 .PARTICLE BEAMS  
 .NEUTRAL BEAMS  
 ...#NEUTRON BEAMS  
 NUCLEAR RADIATION  
 #NEUTRON BEAMS  
 ATOMIC BEAMS  
 PARTICLES  
 PION BEAMS  
 PROTON BEAMS

NEUTRON COUNTERS  
 1406 2203 2403 3009  
 UF NEUTRON DETECTORS  
 GS MEASURING INSTRUMENTS

.COUNTERS  
 ..RADIATION COUNTERS  
 ..#NEUTRON COUNTERS  
 ....NEUTRON SPECTROMETERS  
 .RADIATION MEASURING INSTRUMENTS  
 ..RADIATION COUNTERS  
 ..#NEUTRON COUNTERS  
 ....NEUTRON SPECTROMETERS  
 DOSIMETERS  
 GEIGER COUNTERS  
 IONIZATION CHAMBERS  
 PROPORTIONAL COUNTERS  
 SCINTILLATION COUNTERS  
 SPARK CHAMBERS

NEUTRON CROSS SECTIONS  
 2403 2405  
 RT ABSORPTION CROSS SECTIONS  
 % CROSS SECTIONS  
 NUCLEAR PARTICLES  
 SCATTERING CROSS SECTIONS  
 STOPPING POWER

NEUTRON DECAY  
 2403 2405  
 GS DECAY  
 #NEUTRON DECAY  
 RT HOT ATOMS

NEUTRON DETECTORS  
 USE NEUTRON COUNTERS  
 NEUTRON DIFFRACTION  
 2403 2405 2601  
 GS DIFFRACTION  
 #NEUTRON DIFFRACTION  
 RT CRYSTALLOGRAPHY

NEUTRON DISTRIBUTION  
 2403 2405  
 GS DISTRIBUTION (PROPERTY)  
 #NEUTRON DISTRIBUTION  
 RT NUCLEAR PARTICLES

NEUTRON EMISSION  
 2403 2405  
 GS DECAY  
 .RADIOACTIVE DECAY  
 .#NEUTRON EMISSION  
 EMISSION  
 .PARTICLE EMISSION  
 .#NEUTRON EMISSION  
 NUCLEAR REACTIONS  
 .RADIOACTIVE DECAY  
 .#NEUTRON EMISSION

RT NEUTRONS  
 SELECTION RULES (NUCLEAR PHYSICS)

NEUTRON FLUX  
 USE FLUX (RATE)

NEUTRON FLUX DENSITY  
 2403 2405 3009  
 SN (LIMITED TO NEUTRON EMISSION OR  
 DETECTION RATE PER UNIT AREA)  
 GS RATES (PER TIME)  
 .FLUX DENSITY  
 ..RADIANT FLUX DENSITY  
 ...PARTICLE FLUX DENSITY  
 ....#NEUTRON FLUX DENSITY  
 HIGH FLUX ISOTOPE REACTORS

RT IRRADIANCE  
 NUCLEAR FISSION  
 RADIANCE  
 RADIANCY  
 RADIATION SHIELDING  
 SOLAR NEUTRONS

NEUTRON IRRADIATION  
 2403 2405 2406  
 GS IRRADIATION  
 #NEUTRON IRRADIATION  
 RT ION IRRADIATION  
 TRANSMUTATION

NEUTRON PHYSICS  
 2403 2405  
 RT % PHYSICS  
 % SCIENCE

NEUTRON RADIOGRAPHY  
 1407  
 GS IMAGERY

.RADIOGRAPHY  
 .#NEUTRON RADIOGRAPHY  
 NONDESTRUCTIVE TESTS  
 #NEUTRON RADIOGRAPHY  
 RT % MATERIALS TESTS

NEUTRON SCATTERING  
 2403 2405  
 UF LEGENDRE CODE  
 GS NUCLEAR REACTIONS  
 .NUCLEAR SCATTERING  
 .#NEUTRON SCATTERING  
 SCATTERING  
 .NUCLEAR SCATTERING  
 .#NEUTRON SCATTERING  
 ELEMENTARY PARTICLES  
 RT NUCLEAR PARTICLES

[illegible]

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                   |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                   | % JOURNALS                                                                                                                                                                                                                           | 0101 0102 2311 2801<br>GS LAWS<br>#NEWTON-BUSEMANN LAW                                                                                                                                                                                                                                                         |
| NEW YORK<br>1305<br>GS                                                                                                                            | NATIONS<br>.UNITED STATES<br>.#NEW YORK                                                                                                                                                                                              | NEWTON-RAPHSON METHOD<br>1903 3501<br>GS ANALYSIS (MATHEMATICS)<br>.NUMERICAL ANALYSIS<br>..APPROXIMATION<br>...NEWTON METHODS<br>...#NEWTON-RAPHSON METHOD<br>RT % METHODOLOGY                                                                                                                                |
| RT                                                                                                                                                | ADIRONDACK MOUNTAINS (NY)<br>DELAWARE RIVER BASIN (US)<br>HUDSON RIVER (NY-NJ)<br>LAKE CHAMPLAIN BASIN (NY-VT)<br>LONG ISLAND (NY)<br>NEW YORK CITY (NY)<br>ST LAWRENCE VALLEY (NORTH AMERICA)<br>SUSQUEHANNA RIVER BASIN (MD-NY-PA) | KINETICS<br>NONNEWTONIAN FLUIDS<br>NONNEWTONIAN FLUIDS<br><br>METHODS<br>1903 3501<br>GS ANALYSIS (MATHEMATICS)<br>.NUMERICAL ANALYSIS<br>..APPROXIMATION<br>...NEWTON METHODS<br>...#NEWTON-RAPHSON METHOD<br>..ITERATION<br>..#NEWTON METHODS<br>ITERATIVE SOLUTION<br>PROBLEM SOLVING<br>ROOTS OF EQUATIONS |
| NEW YORK CITY (NY)<br>1305<br>GS CITIES<br>#NEW YORK CITY (NY)<br>RT NEW YORK                                                                     |                                                                                                                                                                                                                                      | NEWTONIAN FLUIDS<br>1202 2311<br>RT ANISOTROPIC FLUIDS<br>% FLUIDS<br>NAVIER-STOKES EQUATION<br>NEWTON PRESSURE LAW<br>NEWTON THEORY<br>NONNEWTONIAN FLUIDS<br>STRESS-STRAIN-TIME RELATIONS<br>VISCOUS FLUIDS                                                                                                  |
| NEW ZEALAND<br>1305<br>GS LANDFORMS<br>.ISLANDS<br>..PACIFIC ISLANDS<br>..#NEW ZEALAND<br>NATIONS<br>#NEW ZEALAND<br>RT NEW ZEALAND SPACE PROGRAM |                                                                                                                                                                                                                                      | NICARAGUA<br>1305<br>GS NATIONS<br>#NICARAGUA<br>RT CENTRAL AMERICA                                                                                                                                                                                                                                            |
| NEW ZEALAND SPACE PROGRAM<br>3009 3409<br>GS PROGRAMS<br>.SPACE PROGRAMS<br>.#NEW ZEALAND SPACE PROGRAM<br>RT NEW ZEALAND                         |                                                                                                                                                                                                                                      | NICHROME (TRADEMARK)<br>0603 1412 1701 1704 2310<br>GS ALLOYS<br>.NICKEL ALLOYS<br>.#NICHROME (TRADEMARK)                                                                                                                                                                                                      |
| NEWFOUNDLAND<br>1305<br>GS LANDFORMS<br>.ISLANDS<br>.#NEWFOUNDLAND<br>NATIONS<br>.CANADA<br>.#NEWFOUNDLAND                                        |                                                                                                                                                                                                                                      | NICKEL<br>1703<br>GS CHEMICAL ELEMENTS<br>#NICKEL<br>..NICKEL ISOTOPE<br>METALS<br>.TRANSITION METALS<br>.#NICKEL<br>...NICKEL ISOTOPE<br>CONSTANTAN<br>RT                                                                                                                                                     |
| NEWS<br>3405<br>RT DOCUMENTATION                                                                                                                  |                                                                                                                                                                                                                                      | NICKEL ALLOYS<br>1701 1704<br>GS ALLOYS<br>#NICKEL ALLOYS<br>..ASTROLOY (TRADEMARK)<br>..HASTELOY (TRADEMARK)<br>..INCONEL (TRADEMARK)                                                                                                                                                                         |
| NEWS MEDIA<br>0702 3405<br>RT DATA ACQUISITION<br>INFORMATION                                                                                     |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

NICOTINIC ACID  
 O403 1808  
 GS  
 .ACIDS  
 .CARBOXYLIC ACIDS  
 .#NICOTINIC ACID  
 ORGANIC COMPOUNDS  
 .CARBOXYLIC ACIDS  
 .#NICOTINIC ACID  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ..#NICOTINIC ACID  
 VITAMINS  
 #NICOTINIC ACID

NIGELLA  
 O404 0409  
 GS  
 PLANTS (BOTANY)  
 #NIGELLA  
 RT BOTANY

NIGER  
 1305  
 GS  
 NATIONS  
 #NIGER  
 RT AFRICA

NIGERIA  
 1305  
 GS  
 NATIONS  
 #NIGERIA  
 RT AFRICA

NIGHT  
 2003 2103 3009  
 RT  
 DARKENING  
 DARKNESS  
 DAYTIME  
 DIURNAL VARIATIONS  
 EVENING  
 SHADOWS  
 SKY BRIGHTNESS  
 TWILIGHT GLOW

NIGHT AIRGLOW  
 USE NIGHTGLOW

NIGHT E LAYER  
 USE E REGION  
 NIGHT SKY

NIGHT F LAYER  
 USE F REGION  
 NIGHT SKY

NIGHT FLIGHTS (AIRCRAFT)  
 O203 0502 1102 1402 2101  
 RT % AIRCRAFT  
 APPROACH CONTROL  
 BLIND LANDING  
 DARKNESS  
 FLIGHT INSTRUMENTS  
 INSTRUMENT APPROACH  
 INSTRUMENT LANDING SYSTEMS  
 NAP-OF-THE-EARTH NAVIGATION  
 RADAR  
 RADIO BEACONS  
 VISIBILITY

NIGHT SKY  
 1301 1302 2003 2402 3001  
 UF  
 NIGHT E LAYER  
 NIGHT F LAYER  
 GS  
 SKY  
 #NIGHT SKY  
 RT AIRGLOW  
 AURORAS  
 GEGENSCHN  
 NIGHTGLOW  
 SKY BRIGHTNESS  
 TWILIGHT GLOW  
 ZODIACAL LIGHT

NIGHT VISION  
 O408 0506  
 GS  
 VISION  
 #NIGHT VISION  
 RT DARK ADAPTATION  
 IMAGE INTENSIFIERS  
 LIGHT ADAPTATION  
 MICROCHANNELS  
 NAP-OF-THE-EARTH NAVIGATION

NIGHTGLOW  
 O710 1301 2003 3001  
 UF  
 NIGHT AIRGLOW  
 GS  
 ATMOSPHERIC RADIATION  
 .SKY RADIATION  
 ..AIRGLOW  
 ..#NIGHTGLOW  
 ELECTROMAGNETIC RADIATION  
 .LIGHT (VISIBLE RADIATION)  
 ..SKY RADIATION  
 ...AIRGLOW  
 ...#NIGHTGLOW  
 BIOMETEOROLOGY  
 NIGHT SKY  
 RADIO AURORAS  
 SKY BRIGHTNESS

RT

NIGOTRONS  
 1504 2309 2402 2403  
 GS  
 ELECTRON TUBES  
 .VACUUM TUBES  
 .MICROWAVE TUBES  
 ...MAGNETRONS  
 ...#NIGOTRONS  
 MICROWAVE EQUIPMENT  
 MICROWAVE OSCILLATORS  
 .MAGNETRONS  
 ..#NIGOTRONS  
 .MICROWAVE TUBES  
 .MAGNETRONS  
 ..#NIGOTRONS  
 OSCILLATORS  
 .MICROWAVE OSCILLATORS  
 .MAGNETRONS  
 ..#NIGOTRONS

NIHON AIRCRAFT  
 O201 0204  
 UF NAMC AIRCRAFT  
 GS #NIHON AIRCRAFT  
 .YS-11 AIRCRAFT  
 RT % AIRCRAFT

NIHON YS-11 AIRCRAFT  
 USE YS-11 AIRCRAFT

NIKE BOOSTER ROCKET ENGINES  
 2808 3101  
 GS  
 ENGINES  
 .ROCKET ENGINES  
 ..BOOSTER ROCKET ENGINES  
 ..#NIKE BOOSTER ROCKET ENGINES  
 ..SOLID PROPELLANT ROCKET ENGINES  
 ..#NIKE BOOSTER ROCKET ENGINES  
 RT % NIKE ROCKETS

NIKE MISSILES  
 3101 3401  
 GS  
 MISSILES  
 .SURFACE TO AIR MISSILES  
 .#NIKE MISSILES  
 ...NIKE-AJAX MISSILE  
 ...NIKE-HERCULES MISSILE  
 ...NIKE-ZEUS MISSILE  
 RT ANTI-AIRCRAFT MISSILES  
 ANTIMISSILE MISSILES  
 % NIKE ROCKETS  
 SENTINEL SYSTEM

NIKE PROJECT  
 3106 3401  
 GS  
 PROGRAMS

|                            |                                                                                    |    |                                                                                                                            |    |                                |
|----------------------------|------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------|----|--------------------------------|
| RT %                       | PROJECTS<br>NIKE PROJECT<br>NIKE ROCKETS                                           | RT | MULTISTAGE ROCKET VEHICLES<br>..NIKE ROCKET VEHICLES<br>..NIKE-APACHE ROCKET VEHICLE<br>RT SOLID PROPELLANT ROCKET ENGINES | RT | SOLID PROPELLANT ROCKET ENGINE |
| NIKE ROCKET VEHICLES       |                                                                                    |    |                                                                                                                            |    |                                |
| 3101 3106 3401             |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-APACHE ROCKET VEHICLE                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE-CAJUN ROCKET VEHICLE                                                          |    |                                                                                                                            |    |                                |
|                            | NIKE-HYDAC ROCKET VEHICLE                                                          |    |                                                                                                                            |    |                                |
|                            | NIKE-TROQUOIS ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | NIKE-JAVELIN ROCKET VEHICLE                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
| RT %                       | NIKE ROCKETS<br>% VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            |                                                                                    |    |                                                                                                                            |    |                                |
| %                          | NIKE ROCKETS                                                                       |    |                                                                                                                            |    |                                |
| 3101 3106 3401             |                                                                                    |    |                                                                                                                            |    |                                |
| SN                         | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW) |    |                                                                                                                            |    |                                |
| RT                         | NIKE BOOSTER ROCKET ENGINES                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE MISSILES                                                                      |    |                                                                                                                            |    |                                |
|                            | NIKE PROJECT                                                                       |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
| NIKE X SYSTEMS             |                                                                                    |    |                                                                                                                            |    |                                |
| 3101 3401                  |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | WEAPON SYSTEMS                                                                     |    |                                                                                                                            |    |                                |
|                            | MISSILE SYSTEMS                                                                    |    |                                                                                                                            |    |                                |
|                            | NIKE X SYSTEMS                                                                     |    |                                                                                                                            |    |                                |
| RT                         | ANTIMISSILE MISSILES                                                               |    |                                                                                                                            |    |                                |
|                            | MISSILES                                                                           |    |                                                                                                                            |    |                                |
|                            | SURFACE TO AIR MISSILES                                                            |    |                                                                                                                            |    |                                |
| %                          | SYSTEMS                                                                            |    |                                                                                                                            |    |                                |
| NIKE-AJAX MISSILE          |                                                                                    |    |                                                                                                                            |    |                                |
| 3101 3106 3401             |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | MISSILES                                                                           |    |                                                                                                                            |    |                                |
|                            | ANTIAIRCRAFT MISSILES                                                              |    |                                                                                                                            |    |                                |
|                            | NIKE-AJAX MISSILE                                                                  |    |                                                                                                                            |    |                                |
|                            | SURFACE TO AIR MISSILES                                                            |    |                                                                                                                            |    |                                |
|                            | NIKE MISSILES                                                                      |    |                                                                                                                            |    |                                |
|                            | NIKE-AJAX MISSILE                                                                  |    |                                                                                                                            |    |                                |
|                            | ARGO ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
| RT                         | EXOS SOUNDING ROCKET                                                               |    |                                                                                                                            |    |                                |
|                            | LIQUID PROPELLANT ROCKET ENGINES                                                   |    |                                                                                                                            |    |                                |
|                            | SOLID PROPELLANT ROCKET ENGINES                                                    |    |                                                                                                                            |    |                                |
|                            | TRAILBLAZER 1 REENTRY VEHICLE                                                      |    |                                                                                                                            |    |                                |
| NIKE-APACHE ROCKET VEHICLE |                                                                                    |    |                                                                                                                            |    |                                |
| 3101 3106 3401             |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | SOUNDING ROCKETS                                                                   |    |                                                                                                                            |    |                                |
| RT                         | NIKE-JAVELIN ROCKET VEHICLE                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
| 3106                       |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | SOUNDING ROCKETS                                                                   |    |                                                                                                                            |    |                                |
| RT                         | NIKE-JAVELIN ROCKET VEHICLE                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
| 3106                       |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | SOUNDING ROCKETS                                                                   |    |                                                                                                                            |    |                                |
| RT                         | NIKE-JAVELIN ROCKET VEHICLE                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
| 3106                       |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | SOUNDING ROCKETS                                                                   |    |                                                                                                                            |    |                                |
| RT                         | NIKE-JAVELIN ROCKET VEHICLE                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
| 3106                       |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
|                            | SOUNDING ROCKETS                                                                   |    |                                                                                                                            |    |                                |
| RT                         | NIKE-JAVELIN ROCKET VEHICLE                                                        |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |
| 3106                       |                                                                                    |    |                                                                                                                            |    |                                |
| GS                         | ROCKET VEHICLES                                                                    |    |                                                                                                                            |    |                                |
|                            | MULTISTAGE ROCKET VEHICLES                                                         |    |                                                                                                                            |    |                                |
|                            | NIKE ROCKET VEHICLES                                                               |    |                                                                                                                            |    |                                |
|                            | NIKE-TOMAHAWK ROCKET VEHICLE                                                       |    |                                                                                                                            |    |                                |



# NASA THESAURUS HIERARCHICAL UPDATE

|                             |                                     |                           |
|-----------------------------|-------------------------------------|---------------------------|
| ESSA SATELLITES             | ..NIMBUS SATELLITES                 | ..HEAT RESISTANT ALLOYS   |
| INFRARED PHOTOGRAPHY        | ..#NIMBUS 7 SATELLITE               | ..REFRACTORY METAL ALLOYS |
| SATELLITE OBSERVATION       | RT TOTAL OZONE MAPPING SPECTROMETER | ..#NIOBIUM ALLOYS         |
| THOR AGENA LAUNCH VEHICLE   |                                     | REFRACTORY MATERIALS      |
|                             |                                     | ..REFRACTORY METAL ALLOYS |
| NIMBUS 1 SATELLITE          | NIMONIC ALLOYS                      | ..#NIOBIUM ALLOYS         |
| 2004 3107                   | 1701 1704                           | RT HAFNIUM ALLOYS         |
| GS                          | GS ALLOYS                           |                           |
| ARTIFICIAL SATELLITES       | ..HEAT RESISTANT ALLOYS             |                           |
| ..METEOROLOGICAL SATELLITES | ..#NIMONIC ALLOYS                   | NIOBIUM CARBIDES          |
| ..NIMBUS SATELLITES         | RT IRON ALLOYS                      | O603 1808                 |
| ..#NIMBUS 1 SATELLITE       | NICKEL ALLOYS                       | GS CARBON COMPOUNDS       |
| RT CLOUD PHOTOGRAPHY        |                                     | ..CARBIDES                |
| THOR AGENA LAUNCH VEHICLE   |                                     | ..#NIOBIUM CARBIDES       |
|                             |                                     | NIOBIUM COMPOUNDS         |
| NIMBUS 2 SATELLITE          | NIMPHE (ENGINE)                     | #NIOBIUM CARBIDES         |
| 2003 2004 3107              | USE HYDRAZINE ENGINES               |                           |
| GS                          |                                     |                           |
| ARTIFICIAL SATELLITES       | NIMROD ACCELERATOR                  | NIOBIUM COMPOUNDS         |
| ..METEOROLOGICAL SATELLITES | 1504 2402 2403                      | O603                      |
| ..NIMBUS SATELLITES         | GS PARTICLE ACCELERATORS            | GS #NIOBIUM COMPOUNDS     |
| ..#NIMBUS 2 SATELLITE       | #NIMROD ACCELERATOR                 | ..NIOBATES                |
| RT CLOUD PHOTOGRAPHY        | RT % ACCELERATORS                   | ..LITHIUM NIOBATES        |
| THOR AGENA LAUNCH VEHICLE   |                                     | ..NIOBIUM CARBIDES        |
|                             |                                     | ..NIOBIUM IODIDES         |
| NIMBUS 3 SATELLITE          | NIOBATES                            | ..NIOBIUM OXIDES          |
| 2004 3107                   | O603 1704 1804                      | ..NIOBIUM STANNIDES       |
| GS                          | GS NIOBIUM COMPOUNDS                | ..CHEMICAL COMPOUNDS      |
| ARTIFICIAL SATELLITES       | ..NIOBATES                          | % GROUP 5B COMPOUNDS      |
| ..METEOROLOGICAL SATELLITES | ..LITHIUM NIOBATES                  | % METAL COMPOUNDS         |
| ..NIMBUS SATELLITES         | RT EUXENITE                         |                           |
| ..#NIMBUS 3 SATELLITE       | OXIDES                              |                           |
|                             | % OXYGEN COMPOUNDS                  |                           |
| NIMBUS 4 SATELLITE          | NIOBIUM                             | NIOBIUM IODIDES           |
| 2004 3107                   | 1703                                | O603 1804                 |
| GS                          | UF COLUMBIUM                        | GS HALOGEN COMPOUNDS      |
| ARTIFICIAL SATELLITES       | GS CHEMICAL ELEMENTS                | ..HALIDES                 |
| ..METEOROLOGICAL SATELLITES | #NIOBIUM                            | ..METAL HALIDES           |
| ..NIMBUS SATELLITES         | ..NIOBIUM ISOTOPES                  | ..#NIOBIUM IODIDES        |
| ..#NIMBUS 4 SATELLITE       | ..NIOBIUM 95                        | ..IODINE COMPOUNDS        |
|                             | METALS                              | ..IODIDES                 |
| NIMBUS 5 SATELLITE          | ..REFRACTORY METALS                 | ..#NIOBIUM IODIDES        |
| 2004 3107                   | ..NIOBIUM                           | NIOBIUM COMPOUNDS         |
| GS                          | ..NIOBIUM ISOTOPES                  | #NIOBIUM IODIDES          |
| ARTIFICIAL SATELLITES       | ..NIOBIUM 95                        |                           |
| ..METEOROLOGICAL SATELLITES | ..TRANSITION METALS                 |                           |
| ..NIMBUS SATELLITES         | ..NIOBIUM                           |                           |
| ..#NIMBUS 5 SATELLITE       | ..NIOBIUM ISOTOPES                  |                           |
|                             | ..NIOBIUM 95                        |                           |
| NIMBUS 6 SATELLITE          | REFRACTORY MATERIALS                |                           |
| 2004 3107                   | ..REFRACTORY METALS                 |                           |
| GS                          | ..NIOBIUM                           |                           |
| ARTIFICIAL SATELLITES       | ..NIOBIUM ISOTOPES                  |                           |
| ..METEOROLOGICAL SATELLITES | ..NIOBIUM 95                        |                           |
| ..NIMBUS SATELLITES         | ..REFRACTORY METALS                 |                           |
| ..#NIMBUS 6 SATELLITE       | ..NIOBIUM                           |                           |
|                             | ..NIOBIUM ISOTOPES                  |                           |
| NIMBUS 7 SATELLITE          | ..NIOBIUM 95                        |                           |
| 3107 3107                   |                                     |                           |
| GS                          | NIOBIUM ALLOYS                      |                           |
| ARTIFICIAL SATELLITES       | 1701 1704                           |                           |
| ..METEOROLOGICAL SATELLITES | GS ALLOYS                           |                           |

....NIOBIUM 95  
 .TRANSITION METALS  
 ..NIOBIUM  
 ...#NIOBIUM ISOTOPES  
 ....NIOBIUM 95  
 REFRACTORY MATERIALS  
 .REFRACTORY METALS  
 ..NIOBIUM  
 ...#NIOBIUM ISOTOPES  
 ....NIOBIUM 95  
  
 NIOBIUM OXIDES  
 O603 1804  
 GS CHALCOGENIDES  
 .OXIDES  
 ..METAL OXIDES  
 ...#NIOBIUM OXIDES  
 NIOBIUM COMPOUNDS  
 #NIOBIUM OXIDES  
  
 NIOBIUM STANNIDES  
 O603 1804  
 GS NIOBIUM COMPOUNDS  
 #NIOBIUM STANNIDES  
 TIN COMPOUNDS  
 .STANNIDES  
 ..#NIOBIUM STANNIDES  
  
 NIOBIUM 95  
 O603 2406  
 GS CHEMICAL ELEMENTS  
 .NIOBIUM  
 ...NIOBIUM ISOTOPES  
 ..#NIOBIUM 95  
 .NUCLIDES  
 ...ISOTOPES  
 ...NIOBIUM ISOTOPES  
 ...#NIOBIUM 95  
 ...RADIOACTIVE ISOTOPES  
 ...#NIOBIUM 95  
 METALS  
 .REFRACTORY METALS  
 ..NIOBIUM  
 ...NIOBIUM ISOTOPES  
 ...#NIOBIUM 95  
 .TRANSITION METALS  
 ..NIOBIUM  
 ...NIOBIUM ISOTOPES  
 ...#NIOBIUM 95  
 REFRACTORY MATERIALS  
 .REFRACTORY METALS  
 ..NIOBIUM  
 ...NIOBIUM ISOTOPES  
 ...#NIOBIUM 95  
  
 NIPS (SYSTEM)  
 USE NASA INTERACTIVE PLANNING SYSTEM  
  
 NITINOL ALLOYS  
 1701 1704  
 GS ALLOYS  
 .NICKEL ALLOYS  
 ..#NITINOL ALLOYS  
 .SHAPE MEMORY ALLOYS  
 ..#NITINOL ALLOYS  
 .TITANIUM ALLOYS  
 ..#NITINOL ALLOYS  
  
 NITRAMINE PROPELLANTS  
 2701  
 GS PROPELLANTS  
 .ROCKET PROPELLANTS  
 ..#NITRAMINE PROPELLANTS  
 .SOLID PROPELLANTS  
 ..#NITRAMINE PROPELLANTS  
 RT OXIDIZERS  
  
 NITRASOL EXPLOSIVES  
 1808 3302  
 GS EXPLOSIVES  
 #NITRASOL EXPLOSIVES  
 PROPELLANTS  
 #NITRASOL EXPLOSIVES  
  
 NITRATE ESTERS  
 O603 1808  
 GS ESTERS  
 #NITRATE ESTERS  
 ..ISOPROPYL NITRATE  
 ..PROPYL NITRATE  
 NITROGEN COMPOUNDS  
 #NITRATE ESTERS  
 ..ISOPROPYL NITRATE  
 ..PROPYL NITRATE  
  
 NITRATES  
 O603  
 GS NITROGEN COMPOUNDS  
 #NITRATES  
 ..DINITRATES  
 ...INORGANIC NITRATES  
 ...AMMONIUM NITRATES  
 ...HYDRAZINE NITRATE  
 ...POTASSIUM NITRATES  
 ...SILVER NITRATES  
 ...SODIUM NITRATES  
 ...METHYL NITRATE  
 ...ORGANIC NITRATES  
 ...CELLULOSE NITRATE  
 ...NITROFORMS  
  
 NITRATION  
 O602 0603  
 GS CHEMICAL REACTIONS  
 #NITRATION  
 RT DENITROGENATION  
  
 NITRIC ACID  
 O603  
 GS ACIDS  
 #NITRIC ACID  
 NITROGEN COMPOUNDS  
 #NITRIC ACID  
 RT NITROUS ACID  
  
 NITRIC OXIDE  
 O603  
 GS CHALCOGENIDES  
 .OXIDES  
 ..NITROGEN OXIDES  
 ...#NITRIC OXIDE  
 NITROGEN COMPOUNDS  
 .NITROGEN OXIDES  
 ..#NITRIC OXIDE  
 RT NITROSOLS  
  
 NITRIDING  
 O602 0603  
 GS CHEMICAL REACTIONS  
 #NITRIDING  
 HARDENING (MATERIALS)  
 #NITRIDING  
 HEAT TREATMENT  
 #NITRIDING  
  
 NITROGEN COMPOUNDS  
 O603 1804  
 GS NITROGEN COMPOUNDS  
 #NITRIDES  
 ..BORON NITRIDES  
 ..METAL NITRIDES  
 ...ALUMINUM NITRIDES  
 ...BERYLLIUM NITRIDES  
 ...GALLIUM NITRIDES  
 ...TANTALUM NITRIDES  
 ...TITANIUM NITRIDES  
 ...ZIRCONIUM NITRIDES  
 ..OXYNITRIDES  
 ..SILICON NITRIDES  
 RT CERAMIC NUCLEAR FUELS  
 MOLTEN SALTS  
  
 NITROGEN COMPOUNDS  
 O603 1804  
 GS NITROGEN COMPOUNDS  
 #NITRIDES  
 ..BORON NITRIDES  
 ..METAL NITRIDES  
 ...ALUMINUM NITRIDES  
 ...BERYLLIUM NITRIDES  
 ...GALLIUM NITRIDES  
 ...TANTALUM NITRIDES  
 ...TITANIUM NITRIDES  
 ...ZIRCONIUM NITRIDES  
 ..OXYNITRIDES  
 ..SILICON NITRIDES  
 RT CERAMIC NUCLEAR FUELS  
 MOLTEN SALTS  
  
 NITRIDING  
 O602 0603  
 GS CHEMICAL REACTIONS  
 #NITRIDING  
 HARDENING (MATERIALS)  
 #NITRIDING  
 HEAT TREATMENT  
 #NITRIDING

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NITRILES
  0603 1808
  GS #NITRILES
    .ACETONITRILE
    .ACRYLONITRILES
    ..POLYACRYLONITRILE
    .MALONONITRILE
    .PHOSPHONITRILES
  RT CYANO COMPOUNDS

NITRITES
  0603 1808
  GS NITROGEN COMPOUNDS
    #NITRITES

NITRO COMPOUNDS
  0603 3302
  GS NITROGEN COMPOUNDS
    #NITRO COMPOUNDS
    ..NITROBENZENES
    ...TRINITROTOLUENE
    ..NITROGLYCERIN
    ..NITROGUANIDINE
    ..NITROMETHANE
    ..NITROPROPANE
    ..PICRATES
    ...AMMONIUM PICRATES
    ..POLYBUTADIENE TETRANITRAMINE
    ..TETRYL
    ..TRINITRO COMPOUNDS
  RT % CHEMICAL COMPOUNDS

NITROAMINES
  0603
  GS AMINES
    #NITROAMINES
    NITROGEN COMPOUNDS
    #NITROAMINES

NITROBACTER
  0407 0412
  GS MICROORGANISMS
    .BACTERIA
    .#NITROBACTER

NITROBENZENES
  0603 3302
  GS NITROGEN COMPOUNDS
    .NITRO COMPOUNDS
    .#NITROBENZENES
    ...TRINITROTOLUENE

NITROCELLULOSE
  USE CELLULOSE NITRATE

NITROFLUORAMINES
  1808
  GS AMINES
    .FLUOROAMINES
    .#NITROFLUORAMINES
    HALOGEN COMPOUNDS
    .FLUORINE COMPOUNDS
    ..FLUORO COMPOUNDS
    ...FLUORINE ORGANIC COMPOUNDS
    ....FLUROAMINES
    ....#NITROFLUORAMINES
    NITROGEN COMPOUNDS
    #NITROFLUORAMINES
    ORGANIC COMPOUNDS
    .FLUORINE ORGANIC COMPOUNDS
    ..FLUROAMINES
    ...#NITROFLUORAMINES

NITROFORMATES
  0603 1808
  GS FORMATES
    #NITROFORMATES
    NITROGEN COMPOUNDS
    #NITROFORMATES

NITROFORMS
  0603 1808
  GS ESTERS
    .ORGANIC NITRATES
    .#NITROFORMS
    ...HYDRAZINE NITROFORM
    NITROGEN COMPOUNDS
    .NITRATES
    ..ORGANIC NITRATES
    ...#NITROFORMS
    ....HYDRAZINE NITROFORM

NITROGEN
  1807
  GS CHEMICAL ELEMENTS
    #NITROGEN
    ..LIQUID NITROGEN
    ..NITROGEN ISOTOPES
    ...NITROGEN 15
    ...NITROGEN 16
    ..SOLID NITROGEN
    GASES
    #NITROGEN
    ..LIQUID NITROGEN
    ..NITROGEN ISOTOPES
    ...NITROGEN 15
    ...NITROGEN 16
    ..SOLID NITROGEN
    RT KJELDAHL METHOD
    NITROGEN ATOMS

NITROGEN ATOMS
  0603 2405
  GS ATOMS
    #NITROGEN ATOMS
    RT NITROGEN

NITROGEN COMPOUNDS
  0603 1704 1804 1808
  GS #NITROGEN COMPOUNDS
    .ALKALOIDS
    ..ATROPINE
    ..BETAINES
    ..CAFFEINE
    ..COLCHICINE
    ..ERGOTAMINE
    ..HYOSCINE
    ..LYSERGINE
    ..MORPHINE
    ..NICOTINAMIDE
    ..NICOTINE
    ..PILOCARPINE
    ..RESERPINE
    ..STRYCHNINE
    ..TROPYL COMPOUNDS
    .AMIDES
    ..ACETANILIDE
    ..ACETAZOLAMIDE
    ..CARBAMIDES
    ..CYANAMIDES
    ..FORMHYDROXAMIC ACID
    ..NICOTINAMIDE
    ..OXAMIC ACIDS
    ..POLYIMIDES
    ...BISMALEIMIDE
    ..SUCCINIMIDES
    ..UREAS
    ...DIFLUOROUREA
    ...THIOUREAS
    ...THIURONIUM
    .AMMONIA
    ..LIQUID AMMONIA
    .AZIDES (INORGANIC)
    ..HYDROGEN AZIDES
    ..SODIUM AZIDES
    .AZIDES (ORGANIC)
    ..SODIUM AZIDES
  
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[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

NITROGEN  
POPULATION INVERSION  
PULSED LASERS  
ULTRAVIOLET LASERS

NITROGEN METABOLISM  
O403 O404 O408  
GS METABOLISM  
#NITROGEN METABOLISM  
RT BIOCHEMISTRY  
% BIOLOGY  
ENZYMOLOGY  
HYDROGEN METABOLISM  
NUTRITION

NITROGEN OXIDES  
O603  
GS CHALCOGENIDES  
.OXIDES  
.#NITROGEN OXIDES  
...NITRIC OXIDE  
...NITROGEN DIOXIDE  
...NITROGEN TETROXIDE  
...NITROUS OXIDES  
NITROGEN COMPOUNDS  
#NITROGEN OXIDES  
.NITRIC OXIDE  
...NITROGEN DIOXIDE  
...NITROGEN TETROXIDE  
...NITROUS OXIDES  
RT NITROSOLS  
NITROUS ACID  
PHOTOCHEMICAL OXIDANTS

NITROGEN PLASMA  
2502  
GS PARTICLES  
.CHARGED PARTICLES  
...ENERGETIC PARTICLES  
...PLASMAS (PHYSICS)  
...#NITROGEN PLASMA

NITROGEN POLYMERS  
O603 1810  
GS NITROGEN COMPOUNDS  
#NITROGEN POLYMERS  
RT % POLYMERS

NITROGEN TETROXIDE  
O603 1804  
GS CHALCOGENIDES  
.OXIDES  
...NITROGEN OXIDES  
...#NITROGEN TETROXIDE  
NITROGEN COMPOUNDS

.NITROGEN OXIDES  
.#NITROGEN TETROXIDE  
LIQUID ROCKET PROPELLANTS  
ROCKET OXIDIZERS

NITROGEN 15  
O603 2406  
GS CHEMICAL ELEMENTS  
.NITROGEN  
...NITROGEN ISOTOPES  
...#NITROGEN 15  
.NUCLIDES  
...ISOTOPES  
...NITROGEN ISOTOPES  
...#NITROGEN 15  
GASES  
.NITROGEN  
...NITROGEN ISOTOPES  
...#NITROGEN 15

NITROGEN 16  
O603 1807 2406  
GS CHEMICAL ELEMENTS  
.NITROGEN  
...NITROGEN ISOTOPES  
...#NITROGEN 16  
.NUCLIDES  
...ISOTOPES  
...NITROGEN ISOTOPES  
...#NITROGEN 16  
...RADIOACTIVE ISOTOPES  
...#NITROGEN 16  
GASES  
.NITROGEN  
...NITROGEN ISOTOPES  
...#NITROGEN 16

NITROGENATION  
O403  
UF NITROGEN FIXATION  
GS CHEMICAL REACTIONS  
#NITROGENATION  
RT LEGUMINOUS PLANTS  
LIGHTNING  
NITROGEN

NITROGLYCERIN  
O603 3302  
GS ESTERS  
.ORGANIC NITRATES  
.#NITROGLYCERIN  
NITROGEN COMPOUNDS  
.NITRATES  
...ORGANIC NITRATES  
...#NITROGLYCERIN

.NITRO COMPOUNDS  
.#NITROGLYCERIN  
DOUBLE BASE PROPELLANTS  
DOUBLE BASE ROCKET PROPELLANTS  
DYNAMITE  
EXPLOSIVES  
GLYCERIDES  
GLYCEROLS

NITROGUANIDINE  
O603 3302  
UF HBNQ  
GS NITROGEN COMPOUNDS  
.NITRO COMPOUNDS  
.#NITROGUANIDINE  
EXPLOSIVES  
RT SOLID PROPELLANTS

NITROLYSIS  
O602  
GS CHEMICAL REACTIONS  
#NITROLYSIS  
DECOMPOSITION  
#NITROLYSIS  
RT CRACKING (CHEMICAL ENGINEERING)  
NITROGEN

NITROMETHANE  
O603 3302  
GS NITROGEN COMPOUNDS  
.NITRO COMPOUNDS  
.#NITROMETHANE  
RT BSX  
EXPLOSIVES

NITRONIUM COMPOUNDS  
O603  
GS #NITRONIUM COMPOUNDS  
.NITRONIUM PERCHLORATE  
RT % CHEMICAL COMPOUNDS

NITRONIUM PERCHLORATE  
O603 2702  
GS HALOGEN COMPOUNDS  
.CHLORINE COMPOUNDS  
...PERCHLORATES  
...#NITRONIUM PERCHLORATE  
NITRONIUM COMPOUNDS  
#NITRONIUM PERCHLORATE  
RT ROCKET OXIDIZERS

NITROPROPANE  
1808  
GS NITROGEN COMPOUNDS  
.NITRO COMPOUNDS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| .#NITROPROPANE<br>ORGANIC COMPOUNDS<br>.HYDROCARBONS<br>..ALIPHATIC HYDROCARBONS<br>...ALKANES<br>...#NITROPROPANE<br>RT PROPANE<br>RT<br>NITROSAMINE<br>1808<br>GS<br>AMINES<br>#NITROSAMINE<br>NITROGEN COMPOUNDS<br>#NITROSAMINE<br>NITROSO COMPOUNDS<br>O603<br>GS<br>NITROGEN COMPOUNDS<br>#NITROSO COMPOUNDS<br>..NITROSYLS<br>RT % CHEMICAL COMPOUNDS<br>ORGANIC COMPOUNDS<br>NITROSYL CHLORIDES<br>O603 1804<br>GS<br>HALOGEN COMPOUNDS<br>.CHLORINE COMPOUNDS<br>..CHLORIDES<br>..#NITROSYL CHLORIDES<br>.HALIDES<br>..CHLORIDES<br>..#NITROSYL CHLORIDES<br>.NITROSYLS<br>.#NITROSYL CHLORIDES<br>NITROSYLS<br>O603<br>GS<br>HALOGEN COMPOUNDS<br>#NITROSYLS<br>..NITROSYL CHLORIDES<br>NITROGEN COMPOUNDS<br>.NITROSO COMPOUNDS<br>.#NITROSYLS<br>AMINES<br>ESTERS<br>HALIDES<br>NITRIC OXIDE<br>NITROGEN OXIDES<br>NITROUS ACID<br>O603<br>RT<br>AIR POLLUTION<br>ATMOSPHERIC CHEMISTRY<br>NITRIC ACID<br>NITROGEN OXIDES | REACTION KINETICS<br>NITROUS OXIDES<br>1804<br>GS<br>CHALCOGENIDES<br>.OXIDES<br>..NITROGEN OXIDES<br>..#NITROUS OXIDES<br>NITROGEN COMPOUNDS<br>.NITROGEN OXIDES<br>.#NITROUS OXIDES<br>NITROXYCHLORIDES<br>1804<br>GS<br>HALOGEN COMPOUNDS<br>.CHLORINE COMPOUNDS<br>..CHLORIDES<br>..#NITROXYCHLORIDES<br>.HALIDES<br>..CHLORIDES<br>..#NITROXYCHLORIDES<br>NITROGEN COMPOUNDS<br>#NITROXYCHLORIDES<br>NITRYL CHLORIDES<br>1804<br>GS<br>HALOGEN COMPOUNDS<br>.CHLORINE COMPOUNDS<br>..CHLORIDES<br>..#NITRYL CHLORIDES<br>.HALIDES<br>..CHLORIDES<br>..#NITRYL CHLORIDES<br>NITROGEN COMPOUNDS<br>#NITRYL CHLORIDES<br>NITRYL FLUORIDES<br>1804<br>GS<br>HALOGEN COMPOUNDS<br>.FLUORINE COMPOUNDS<br>..FLUORIDES<br>..#NITRYL FLUORIDES<br>NITROGEN COMPOUNDS<br>#NITRYL FLUORIDES<br>NMR<br>USE<br>NUCLEAR MAGNETIC RESONANCE<br>NOAA E<br>USE<br>NOAA 8 SATELLITE<br>NOAA F<br>USE<br>SATELLITE<br>NOAA 9 SATELLITE<br>NOAA G<br>USE<br>SATELLITE | USE<br>NOAA 10 SATELLITE<br>NOAA SATELLITES<br>2002 2004<br>GS<br>ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>.#NOAA SATELLITES<br>...NOAA 2 SATELLITE<br>...NOAA 3 SATELLITE<br>...NOAA 4 SATELLITE<br>...NOAA 5 SATELLITE<br>...NOAA 6 SATELLITE<br>...NOAA 7 SATELLITE<br>...NOAA 8 SATELLITE<br>...NOAA 9 SATELLITE<br>...NOAA 10 SATELLITE<br>RT SMS 1<br>SMS 2<br>NOAA 2 SATELLITE<br>2002 2004<br>GS<br>ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>.#NOAA SATELLITES<br>..#NOAA 2 SATELLITE<br>NOAA 3 SATELLITE<br>2002 2004<br>GS<br>ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>.#NOAA SATELLITES<br>..#NOAA 3 SATELLITE<br>NOAA 4 SATELLITE<br>3107<br>GS<br>ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>.#NOAA SATELLITES<br>..#NOAA 4 SATELLITE<br>NOAA 5 SATELLITE<br>3107<br>GS<br>ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>.#NOAA SATELLITES<br>..#NOAA 5 SATELLITE<br>NOAA 6 SATELLITE<br>3107<br>GS<br>ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>.#NOAA SATELLITES<br>..#NOAA 6 SATELLITE<br>RT<br>ADVANCED VERY HIGH RESOLUTION<br>RADIOMETER |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

# NASA THESAURUS HIERARCHICAL UPDATE

NOAA 7 SATELLITE  
 1901  
 GS ARTIFICIAL SATELLITES  
 .METEOROLOGICAL SATELLITES  
 ..NOAA SATELLITES  
 ..#NOAA 7 SATELLITE  
 RT ADVANCED VERY HIGH RESOLUTION  
 RADIOMETER  
 TIROS N SERIES SATELLITES

NOAA 8 SATELLITE  
 3107  
 UF NOAA E  
 GS ARTIFICIAL SATELLITES  
 .METEOROLOGICAL SATELLITES  
 ..NOAA SATELLITES  
 ..#NOAA 8 SATELLITE  
 RT ADVANCED VERY HIGH RESOLUTION  
 RADIOMETER  
 SARSAT

NOAA 9 SATELLITE  
 3107  
 UF NOAA F SATELLITE  
 GS ARTIFICIAL SATELLITES  
 .METEOROLOGICAL SATELLITES  
 ..NOAA SATELLITES  
 ..#NOAA 9 SATELLITE

NOAA 10 SATELLITE  
 3107  
 UF NOAA G SATELLITE  
 GS ARTIFICIAL SATELLITES  
 .METEOROLOGICAL SATELLITES  
 ..NOAA SATELLITES  
 ..#NOAA 10 SATELLITE

NOBELIUM  
 0603 1703 2406  
 GS CHEMICAL ELEMENTS  
 .ACTINIDE SERIES  
 ..TRANSURANIUM ELEMENTS  
 ..#NOBELIUM  
 .NUCLIDES  
 ..ISOTOPES  
 ...RADIOACTIVE ISOTOPES  
 ....TRANSURANIUM ELEMENTS  
 .....#NOBELIUM  
 METALS  
 .ACTINIDE SERIES  
 ..TRANSURANIUM ELEMENTS  
 ..#NOBELIUM  
 RT NOBELIUM ISOTOPES

NOBELIUM ISOTOPES  
 0603 2406  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 ..ISOTOPES  
 ..#NOBELIUM ISOTOPES  
 RT NOBELIUM

NOBLE GASES  
 USE RARE GASES

NOBLE METALS  
 0603  
 UF PRECIOUS METALS  
 GS METALS  
 #NOBLE METALS  
 ..GOLD  
 ...GOLD ISOTOPES  
 ....GOLD 198  
 ..RUTHENIUM  
 ...RUTHENIUM ISOTOPES  
 ..SILVER  
 ...SILVER ISOTOPES  
 RT % GROUP 1B COMPOUNDS

NOCTILUCENCE  
 USE LUMINESCENCE  
 NOCTILUCENT CLOUDS  
 0605 1302 2003 3009  
 GS CLOUDS (METEOROLOGY)  
 #NOCTILUCENT CLOUDS  
 RT LUMINESCENCE

NOCTURNAL VARIATIONS  
 1902  
 GS VARIATIONS  
 .MAGNETIC VARIATIONS  
 .#NOCTURNAL VARIATIONS  
 .PERIODIC VARIATIONS  
 .#NOCTURNAL VARIATIONS  
 RT DIURNAL VARIATIONS  
 GEOMAGNETIC MICROPULSATIONS  
 GEOMAGNETIC PULSATIONS

NODES (STANDING WAVES)  
 1901 2402  
 RT ANTINODES  
 HARMONICS  
 RESONANT FREQUENCIES  
 STANDING WAVES  
 VIBRATION  
 WAVELENGTHS  
 % WAVES

NODULES  
 0404 0409  
 RT LEGUMINOUS PLANTS  
 PARTICLES  
 SPHERES  
 SPHERULITES

NOE NAVIGATION  
 USE NAP-OF-THE-EARTH NAVIGATION

NOESS  
 3107  
 SN (NATIONAL OPERATIONAL  
 ENVIRONMENTAL SATELLITE SYSTEM)  
 UF NATIONAL OPERATIONAL ENVIRONMENTAL  
 SAT SYS  
 RT METEOROLOGICAL SATELLITES  
 METEOROLOGY  
 NASA PROGRAMS  
 OBSERVATION  
 % SYSTEMS

% NOISE  
 0704  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT BACKGROUND NOISE  
 CONTINUOUS NOISE  
 EFFECTIVE PERCEIVED NOISE LEVELS  
 ELECTROMAGNETIC NOISE  
 HUM  
 INFORMATION THEORY  
 NOISE (SOUND)  
 NOISE PROPAGATION  
 NOISE SPECTRA  
 RANDOM NOISE  
 SIGNAL TO NOISE RATIOS  
 SPATIAL FILTERING  
 WHITE NOISE

NOISE (SOUND)  
 0704 0710 2402  
 UF NOISE HAZARDS  
 GS ELASTIC WAVES  
 .SOUND WAVES  
 .#NOISE (SOUND)  
 ...AERODYNAMIC NOISE  
 ...BLADE SLAP NOISE  
 ...PROPELLER NOISE  
 ...AIRCRAFT NOISE  
 ...BLADE SLAP NOISE  
 ...JET AIRCRAFT NOISE  
 ...PROPELLER NOISE  
 ....SONIC BOOMS

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

|                               |                                  |                           |
|-------------------------------|----------------------------------|---------------------------|
| SUPPRESSORS                   | O408 O506                        | USE HEAT TRANSFER         |
| SYNCHROPHASING                | RT HAZARDS                       |                           |
| VIBRATION ISOLATORS           | HUMAN TOLERANCES                 | NONADIABATIC THEORY       |
|                               | TOLERANCES (PHYSIOLOGY)          | 1203 2307 3501            |
|                               |                                  | RT ADIABATIC EQUATIONS    |
| NOISE SPECTRA                 | NOMAD LAUNCH VEHICLE             | CHARGED PARTICLES         |
| O704 2402 3501                | 3103                             | ENERGY DISSIPATION        |
| GS SPECTRA                    | GS LAUNCH VEHICLES               | IONIZATION CROSS SECTIONS |
| RT #NOISE SPECTRA             | #NOMAD LAUNCH VEHICLE            | MAGNETIC DISTURBANCES     |
| ACOUSTIC FREQUENCIES          | ROCKET VEHICLES                  | % THEORIES                |
| BACKGROUND NOISE              | .SINGLE STAGE ROCKET VEHICLES    | WAVE PROPAGATION          |
| CHANNEL NOISE                 | .#NOMAD LAUNCH VEHICLE           |                           |
| ELECTROMAGNETIC COMPATIBILITY | RT ATLAS LAUNCH VEHICLES         | NONANES                   |
| ELECTROMAGNETIC NOISE         | LIQUID PROPELLANT ROCKET ENGINES | 1807 1808                 |
| ELECTROMAGNETIC SPECTRA       |                                  | GS ORGANIC COMPOUNDS      |
| NOISE (SOUND)                 | NOMENCLATURES                    | .HYDROCARBONS             |
| RADIATION SPECTRA             | 3405                             | ...ALIPHATIC HYDROCARBONS |
| RANDOM NOISE                  | RT DEFINITION                    | ...ALKANES                |
| RANDOM SIGNALS                | DESCRIPTIONS                     | ...#NONANES               |
| SHOCK SPECTRA                 | DICTIONARIES                     |                           |
| SIGNAL TO NOISE RATIOS        | MNEMONICS                        | NONAQUEOUS ELECTROLYTES   |
| WHITE NOISE                   | SEMANTICS                        | O604 1703 1802 1807 2304  |
|                               | SYMBOLS                          | GS CONDUCTORS             |
| NOISE STORMS                  | TERMINOLOGY                      | .ELECTROLYTES             |
| O704 0710 2402                | THESAURI                         | .#NONAQUEOUS ELECTROLYTES |
| GS STORMS                     |                                  | RT ELECTRIC BATTERIES     |
| RT #NOISE STORMS              | NOMINAL VALUES                   | % ELECTRIC CELLS          |
| COSMIC NOISE                  | USE APPROXIMATION                | ELECTROCHEMISTRY          |
| ELECTROMAGNETIC NOISE         |                                  | ELECTROLYTIC CELLS        |
| IONOSPHERIC STORMS            | NOMOGRAMS                        | PRIMARY BATTERIES         |
| MAGNETIC STORMS               | USE NOMOGRAMS                    | STORAGE BATTERIES         |
| RADIO FREQUENCY INTERFERENCE  |                                  | WET CELLS                 |
| SOLAR STORMS                  | NOMOGRAMS                        |                           |
|                               | 1902 3501                        | NONCONDENSABLE GASES      |
| NOISE SUPPRESSORS             | UF ISOPLETHS                     | 1203 1807 3501            |
| USE NOISE REDUCTION           | NOMOGRAMS                        | GS GASES                  |
|                               | GS ANALYSIS (MATHEMATICS)        | #NONCONDENSABLE GASES     |
| NOISE TEMPERATURE             | .NUMERICAL ANALYSIS              | RT CRITICAL TEMPERATURE   |
| O704 2402 3501                | .#NOMOGRAMS                      | GAS-LIQUID INTERACTIONS   |
| GS TEMPERATURE                | RT CHARTS                        | LIQUEFACTION              |
| RT #NOISE TEMPERATURE         | GRAPHS (CHARTS)                  |                           |
| ELECTROMAGNETIC NOISE         |                                  | NONCONDUCTORS             |
| ELECTRON ENERGY               | NON-INTRUSIVE MEASUREMENT        | USE ELECTRICAL INSULATION |
| ELECTRON STATES               | USE NONINTRUSIVE MEASUREMENT     |                           |
| TEMPERATURE MEASUREMENT       |                                  | NONCONSERVATIVE FORCES    |
| THERMAL NOISE                 | NONADIABATIC CONDITIONS          | 2311                      |
|                               | 3303 3501                        | RT CONSERVATION           |
| NOISE THRESHOLD               | GS CONDITIONS                    | CONSERVATION EQUATIONS    |
| O704 0902 2402                | #NONADIABATIC CONDITIONS         | CONSERVATION LAWS         |
| RT AUDITORY FATIGUE           | RT ENERGY TRANSFER               | CONTINUITY EQUATION       |
| AUDITORY PERCEPTION           | HEAT TRANSFER                    | % FORCE                   |
| BACKGROUND NOISE              | NONISOTHERMAL PROCESSES          |                           |
| SIGNAL TO NOISE RATIOS        | THERMODYNAMICS                   | NONDESTRUCTIVE TESTS      |
| % THRESHOLDS                  |                                  | 1106 1108 1505 3501       |
|                               | NONADIABATIC PROCESSES           | UF FLAW DETECTION         |
| NOISE TOLERANCE               |                                  |                           |

```

GS #NONDESTRUCTIVE TESTS
  .NEUTRON RADIOGRAPHY
RT ACOUSTIC EMISSION
  ACOUSTIC IMAGING
  ADHESION TESTS
  CHEMICAL TESTS
  DESTRUCTIVE TESTS
  ELECTRONIC EQUIPMENT TESTS
  ENGINE TESTS
  HARDNESS TESTS
  HIGH TEMPERATURE TESTS
  INFRARED INSPECTION
  INSPECTION
  LOAD TESTS
  LOW TEMPERATURE TESTS
  % MATERIALS TESTS
    NONINTRUSIVE MEASUREMENT
    PHOTOACOUSTIC MICROSCOPY
    QUALITY CONTROL
    RADIOGRAPHY
    RELIABILITY
    SH WAVES
    STATIC TESTS
    % TESTS
      THERMOGRAPHY
      TOLERANCES (MECHANICS)
      ULTRASONIC FLAW DETECTION
      ULTRASONIC SPECTROSCOPY
      ULTRASONIC TESTS
      X RAY INSPECTION

NONELECTROLYTES
0603 2302
RT ELECTROLYTES

NONEQUILIBRIUM CONDITIONS
0404 0406 0601 0602 2401 3304
GS CONDITIONS
  #NONEQUILIBRIUM CONDITIONS
RT % EQUILIBRIUM
  UNSTEADY STATE

NONEQUILIBRIUM DRAG
USE FRICTION DRAG

NONEQUILIBRIUM FLOW
1202 1203
GS FLUID FLOW
  .GAS FLOW
  .#NONEQUILIBRIUM FLOW
RT EQUILIBRIUM FLOW
  % FLUIDS
    HEAT TRANSMISSION
    OSCILLATING FLOW
    QUASI-STEADY STATES

UNSTEADY FLOW

NONEQUILIBRIUM IONIZATION
0602 0603
GS IONIZATION
  #NONEQUILIBRIUM IONIZATION

NONEQUILIBRIUM PLASMAS
2502
GS PARTICLES
  .CHARGED PARTICLES
  ...ENERGETIC PARTICLES
  ...PLASMAS (PHYSICS)
  ...#NONEQUILIBRIUM PLASMAS
RT MAGNETOHYDRODYNAMIC STABILITY
  NONUNIFORM PLASMAS
  PLASMA COMPOSITION
  PLASMA POTENTIALS
  PLASMA RADIATION
  PLASMA SHEATHS
  ROTATING PLASMAS

NONEQUILIBRIUM RADIATION
2402 2405 2903
GS ELECTROMAGNETIC RADIATION
  #NONEQUILIBRIUM RADIATION
RT NONTHERMAL RADIATION
  SHOCK WAVE PROPAGATION

NONEQUILIBRIUM THERMODYNAMICS
0404 3304
GS THERMODYNAMICS
  #NONEQUILIBRIUM THERMODYNAMICS
RT IRREVERSIBLE PROCESSES

NONEUCLIDIAN GEOMETRY
USE DIFFERENTIAL GEOMETRY

NONFERROUS METALS
1701 1703 1704
GS METALS
  #NONFERROUS METALS
RT CHEMICAL ELEMENTS
  CONDUCTORS
  % METALLURGY

NONFLAMMABLE MATERIALS
1804 1805 3301
RT ASBESTOS
  FIREPROOFING
  % INORGANIC MATERIALS
    KEVLAR (TRADEMARK)
  % MATERIALS
    OXIDES
    REFRACTORY MATERIALS

NONHOMOGENEITY
USE INHOMOGENEITY

NONINTRUSIVE MEASUREMENT
UF NON-INTRUSIVE MEASUREMENT
RT FLOW MEASUREMENT
  LASER DOPPLER VELOCIMETERS
  % MEASUREMENT
    NONDESTRUCTIVE TESTS
    OPTICAL MEASUREMENT
    TEMPERATURE MEASUREMENT

NONISENTROPICITY
0603 2003 2404
GS ISENTROPIC PROCESSES
  #NONISENTROPICITY
RT ENTROPY
  % PROCESSES

NONISOTHERMAL PROCESSES
3303 3501
RT ENERGY TRANSFER
  HEAT TRANSFER
  NONADIABATIC CONDITIONS
  PRESSURE EFFECTS
  % PROCESSES

NONGRAY ATMOSPHERES
1301 1302 3009
RT % ATMOSPHERES
  BLACK BODY RADIATION
  EMISSIVITY
  GRAY GAS
  PLANETARY ATMOSPHERES

NONGRAY GAS
1301 1302 3005 3303
GS GASES
  #NONGRAY GAS
RT % ATMOSPHERES
  BLACK BODY RADIATION
  EMISSIVITY
  HEAT TRANSFER
  SPECTRAL EMISSION
  THERMAL RADIATION
  THERMODYNAMICS

NONHOLONOMIC EQUATIONS
1902
GS ANALYSIS (MATHEMATICS)
  .COMPLEX VARIABLES
  .#NONHOLONOMIC EQUATIONS
RT ANALYTIC FUNCTIONS
  % EQUATIONS

NONHOMOGENEITY
USE INHOMOGENEITY

NONINTRUSIVE MEASUREMENT
UF NON-INTRUSIVE MEASUREMENT
RT FLOW MEASUREMENT
  LASER DOPPLER VELOCIMETERS
  % MEASUREMENT
    NONDESTRUCTIVE TESTS
    OPTICAL MEASUREMENT
    TEMPERATURE MEASUREMENT

NONISENTROPICITY
0603 2003 2404
GS ISENTROPIC PROCESSES
  #NONISENTROPICITY
RT ENTROPY
  % PROCESSES

NONISOTHERMAL PROCESSES
3303 3501
RT ENERGY TRANSFER
  HEAT TRANSFER
  NONADIABATIC CONDITIONS
  PRESSURE EFFECTS
  % PROCESSES

```

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                                                                                                                             |                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPERATURE GRADIENTS<br>THERMODYNAMICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RT | FEEDBACK AMPLIFIERS<br>FEEDBACK CONTROL<br>NEGATIVE FEEDBACK<br>POSITIVE FEEDBACK<br>SENSORY FEEDBACK<br>TRANSFER FUNCTIONS | NONLINEARITY<br>1902 3408<br>UF QUASILINEARITY<br>RT DIFFERENTIAL EQUATIONS<br>FUNCTIONS (MATHEMATICS)<br>LINEARITY<br>MAGNETIC AMPLIFIERS<br>VARIABILITY<br>VOLTERRA EQUATIONS                     |
| NONISOTROPIC PLATES<br>USE ANISOTROPIC PLATES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                             |                                                                                                                                                                                                     |
| NONISOTROPY<br>USE ANISOTROPY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                             |                                                                                                                                                                                                     |
| NONLIFTING VEHICLES<br>USE BALLISTIC VEHICLES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                             |                                                                                                                                                                                                     |
| NONLINEAR EQUATIONS<br>1902 3501<br>GS ALGEBRA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                                             | NONNEWTONIAN FLOW<br>1202<br>GS FLUID FLOW<br>#NONNEWTONIAN FLOW<br>RT LIQUID FLOW<br>STEADY FLOW<br>THIXOTROPY<br>UNSTEADY FLOW<br>VISCOELASTICITY<br>VISCOPLASTICITY                              |
| ...CUBIC EQUATIONS<br>...DUFFING DIFFERENTIAL EQUATION<br>...MONGE-AMPERE EQUATION<br>...NONLINEAR EVOLUTION EQUATIONS<br>...QUADRATIC EQUATIONS<br>...QUARTIC EQUATIONS<br>ANALYSIS (MATHEMATICS)<br>...REAL VARIABLES<br>...NONLINEAR EQUATIONS<br>...CUBIC EQUATIONS<br>...DUFFING DIFFERENTIAL EQUATION<br>...MONGE-AMPERE EQUATION<br>...NONLINEAR EVOLUTION EQUATIONS<br>...QUADRATIC EQUATIONS<br>...QUARTIC EQUATIONS<br>BORN-INFELD THEORY<br>DIFFERENTIAL EQUATIONS<br>% EQUATIONS<br>FIELD THEORY (ALGEBRA)<br>INTEGRAL EQUATIONS<br>POLYNOMIALS<br>ROOTS OF EQUATIONS |    |                                                                                                                             | NONNEWTONIAN FLUIDS<br>0603 2311<br>RT COLLOIDS<br>% FLUIDS<br>GELATINS<br>GELS<br>NEWTON<br>NEWTON THEORY<br>NEWTONIAN FLUIDS<br>RHEOLOGY<br>VISCOELASTICITY<br>VISCOPLASTICITY<br>VISCIOUS FLUIDS |
| NONLINEAR EVOLUTION EQUATIONS<br>2201 3501<br>GS ALGEBRA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                                                                                                                             | NONOHMIC EFFECT<br>0902 1001 1002 1202 2304<br>RT BARRIER LAYERS<br>CONTACT RESISTANCE<br>% EFFECTS<br>SPACE CHARGE                                                                                 |
| ...NONLINEAR EQUATIONS<br>...NONLINEAR EVOLUTION EQUATIONS<br>ANALYSIS (MATHEMATICS)<br>...REAL VARIABLES<br>...NONLINEAR EQUATIONS<br>...NONLINEAR EVOLUTION EQUATIONS<br>% EQUATIONS                                                                                                                                                                                                                                                                                                                                                                                            |    |                                                                                                                             | NONOSCILLATORY ACTION<br>2311<br>GS OSCILLATIONS<br>#NONOSCILLATORY ACTION<br>RT OSCILLATION DAMPERS<br>OSCILLATORS<br>VIBRATION DAMPING                                                            |
| NONLINEAR FEEDBACK<br>1001 1003<br>GS FEEDBACK<br>#NONLINEAR FEEDBACK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |                                                                                                                             | NONPARAMETRIC STATISTICS<br>1905<br>GS STATISTICAL ANALYSIS<br>#NONPARAMETRIC STATISTICS                                                                                                            |

## RT % STATISTICS

NONPOINT SOURCES  
2201  
RT CONTAMINANTS  
CONTAMINATION  
DIFFUSION  
ENVIRONMENTS  
GASES  
LIQUIDS  
PARTICLES  
% POINTS  
POISONS  
POLLUTION  
PUBLIC HEALTH  
RADIOACTIVE WASTES  
% SOURCES  
TOXICOLOGY  
WASTES

NONPOLAR GASES  
0603  
GS  
RT #NONPOLAR GASES  
MOLECULAR GASES  
RARE GASES

NONREFLECTION  
USE ENERGY ABSORPTION

NONRELATIVISTIC ELECTRONS  
USE ELECTRONS

NONRELATIVISTIC MECHANICS  
2308  
RT NEWTON THEORY  
RELATIVITY

NONRESONANCE  
2301 2304 2402  
RT MICROWAVE RESONANCE  
TRANSMISSION LINES  
TRAVELING WAVES

NONRIGIDITY  
USE FLEXIBILITY

NONSTABILIZED OSCILLATION  
2311  
GS OSCILLATIONS  
#NONSTABILIZED OSCILLATION  
OSCILLATION DAMPERS  
OSCILLATORS  
PILOT INDUCED OSCILLATION  
STABLE OSCILLATIONS

## VIBRATION DAMPING

NONSYNCHRONIZATION  
2311 3407 3408  
RT DEVIATION  
INCOHERENCE  
% INTERFERENCE  
NONUNIFORMITY

NONTHERMAL EMISSION  
USE NONTHERMAL RADIATION

NONTHERMAL RADIATION  
2304 2306 2402 2403 2901 2902 2903  
UF NONTHERMAL EMISSION  
GS ELECTROMAGNETIC RADIATION  
#NONTHERMAL RADIATION  
..CYCLOTRON RADIATION  
...ION CYCLOTRON RADIATION  
..SYNCHROTRON RADIATION  
GALACTIC RADIATION  
MAGNETIC FIELDS  
NONEQUILIBRIUM RADIATION  
% RADIATION  
RADIO WAVES  
THERMAL RADIATION

NONUNIFORM FLOW  
1202  
GS FLUID FLOW  
#NONUNIFORM FLOW  
FLOW CHARACTERISTICS  
RT GAS FLOW  
TURBULENT FLOW  
UNIFORM FLOW  
UNSTEADY FLOW

NONUNIFORM MAGNETIC FIELDS  
1307 2402  
GS MAGNETIC FIELDS  
#NONUNIFORM MAGNETIC FIELDS  
RT DIFFRACTION RADIATION  
LINES OF FORCE  
MAGNETIC ANOMALIES  
MAGNETIC MIRRORS

NONUNIFORM PLASMAS  
2405 2502  
GS PARTICLES  
..CHARGED PARTICLES  
..ENERGETIC PARTICLES  
...PLASMAS (PHYSICS)  
...#NONUNIFORM PLASMAS  
RT KELVIN-HELMHOLTZ INSTABILITY  
LOW DENSITY RESEARCH

## MAGNETOHYDRODYNAMIC STABILITY

NONEQUILIBRIUM PLASMAS  
PLASMA COMPOSITION  
PLASMA OSCILLATIONS  
PLASMA WAVES  
RAREFIED PLASMAS

## NONUNIFORMITY

3408  
RT FLEXIBILITY  
INHOMOGENEITY  
IRREGULARITIES  
NONSYNCHRONIZATION  
OSCILLATIONS  
TURBULENCE

NONVISCOUS FLOW  
USE INVISCID FLOW

NOON  
1406 3001  
RT DAYTIME  
ZENITH

NORADRENALINE  
0403 0405 0408 1808  
GS DRUGS

.STIMULANTS  
.#NORADRENALINE  
RT NOREPINEPHRINE

## NORD AIRCRAFT

0201 0204 0207  
GS #NORD AIRCRAFT  
.C-160 AIRCRAFT  
.MH-262 AIRCRAFT  
.NORD 1500 AIRCRAFT  
RT % AIRCRAFT

## NORD 262 AIRCRAFT

USE MH-262 AIRCRAFT

## NORD 1500 AIRCRAFT

0201 0204  
UF GRIFFON AIRCRAFT  
GS JET AIRCRAFT  
#NORD 1500 AIRCRAFT  
MONOPLANES  
#NORD 1500 AIRCRAFT  
NORD AIRCRAFT  
#NORD 1500 AIRCRAFT  
RESEARCH AIRCRAFT  
#NORD 1500 AIRCRAFT  
SUPERSONIC AIRCRAFT  
#NORD 1500 AIRCRAFT

# NASA THESAURUS HIERARCHICAL UPDATE

## RT % AIRCRAFT

NOREPINEPHRINE  
 O404 0408 1808  
 GS AMINES  
 .CATECHOLAMINE  
 ..EPINEPHRINE  
 ..#NOREPINEPHRINE  
 DRUGS  
 .EPINEPHRINE  
 .#NOREPINEPHRINE  
 .STIMULANTS  
 .#NOREPINEPHRINE  
 RT NORADRENALINE  
 NORLEUCINE  
 O403 1808  
 GS ACIDS  
 .AMINO ACIDS  
 ..LEUCINE  
 ..#NORLEUCINE  
 ORGANIC COMPOUNDS  
 .AMINO ACIDS  
 ..LEUCINE  
 ..#NORLEUCINE  
 NORMAL DENSITY FUNCTIONS  
 1903 1905  
 UF GAUSSIAN DISTRIBUTIONS  
 NORMAL DISTRIBUTIONS  
 FUNCTIONS (MATHEMATICS)  
 .PROBABILITY DENSITY FUNCTIONS  
 .#NORMAL DENSITY FUNCTIONS  
 STATISTICAL ANALYSIS  
 .PROBABILITY DENSITY FUNCTIONS  
 .#NORMAL DENSITY FUNCTIONS  
 CONTINUITY (MATHEMATICS)  
 DISCRETE FUNCTIONS  
 HISTOGRAMS  
 NORMAL DISTRIBUTIONS  
 USE NORMAL DENSITY FUNCTIONS  
 NORMAL FORCE DISTRIBUTION  
 USE FORCE DISTRIBUTION  
 NORMAL SHOCK WAVES  
 O101 1202 1203 2308  
 GS ELASTIC WAVES  
 .SHOCK WAVES  
 .#NORMAL SHOCK WAVES  
 LONGITUDINAL WAVES  
 MAGNETOHYDRODYNAMIC WAVES  
 OBLIQUE SHOCK WAVES  
 PLANE WAVES

## SHOCK LAYERS

NORMALITY  
 O502 0601 0802 0803 1505 1903  
 RT ASYMPTOTIC PROPERTIES  
 AVERAGE  
 MEAN  
 MEDIAN (STATISTICS)  
 NORMS  
 STATISTICAL TESTS  
 % NORMALIZING  
 1704 1905  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT NORMALIZING (HEAT TREATMENT)  
 NORMALIZING (STATISTICS)  
 REGULARITY  
 NORMALIZING (HEAT TREATMENT)  
 1704  
 GS HEAT TREATMENT  
 #NORMALIZING (HEAT TREATMENT)  
 RT ANNEALING  
 HARDENING (MATERIALS)  
 LASER ANNEALING  
 % NORMALIZING  
 TEMPERING  
 NORMALIZING (STATISTICS)  
 1905  
 RT EVALUATION  
 % QUALITY CONTROL  
 RATINGS  
 RENORMALIZATION GROUP METHODS  
 NORMS  
 O410 1902 3406  
 GS NAMING  
 #NORMS  
 RT AVERAGE  
 ETHICS  
 MEDIAN (STATISTICS)  
 NORMALITY  
 PSYCHOMETRICS  
 VALUE  
 NORTH AMERICA  
 1305  
 GS CONTINENTS  
 #NORTH AMERICA  
 RT APPALACHIAN MOUNTAINS (NORTH  
 AMERICA)

CANADA  
 CENTRAL AMERICA  
 LOWER CALIFORNIA (MEXICO)  
 MEXICO  
 TUNDRA  
 UNITED STATES  
 WILLISTON BASIN (NORTH AMERICA)  
 NORTH AMERICAN AIRCRAFT  
 O201 0204 0207  
 GS #NORTH AMERICAN AIRCRAFT  
 .A-2 AIRCRAFT  
 .A-5 AIRCRAFT  
 .B-1 AIRCRAFT  
 .B-70 AIRCRAFT  
 .F-86 AIRCRAFT  
 .F-100 AIRCRAFT  
 .OV-10 AIRCRAFT  
 .P-51 AIRCRAFT  
 .T-2 AIRCRAFT  
 .T-28 AIRCRAFT  
 .T-39 AIRCRAFT  
 .X-15 AIRCRAFT  
 RT % AIRCRAFT  
 NORTH AMERICAN SEARCH AND RANGING RADAR  
 O702 0705 3401  
 UF NASARR  
 GS RADAR  
 .SEARCH RADAR  
 .#NORTH AMERICAN SEARCH AND  
 RANGING RADAR  
 RT RANGE AND RANGE RATE TRACKING  
 NORTH ATLANTIC TREATY ORGANIZATION (NATO)  
 3401  
 GS ORGANIZATIONS  
 #NORTH ATLANTIC TREATY  
 ORGANIZATION (NATO)  
 RT INTERNATIONAL COOPERATION  
 NORTH CAROLINA  
 1305  
 GS NATIONS  
 .UNITED STATES  
 .#NORTH CAROLINA  
 CAPE HATTERAS (NC)  
 GREAT SMOKY MOUNTAINS (NC-TN)  
 OUTER BANKS (NC)  
 SAND HILLS REGION (GA-NC-SC)  
 NORTH DAKOTA  
 1305  
 GS NATIONS  
 .UNITED STATES

|                                             |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                          | .#NORTH DAKOTA<br>MISSOURI RIVER (US)<br>WILLISTON BASIN (NORTH AMERICA)                                                                                                                                                                                        | ASTRONOMICAL OBSERVATORIES<br>NORTHERN HEMISPHERE<br>SKY SURVEYS (ASTRONOMY)<br>SOUTHERN SKY                                                                                                                                    | NOSE (ANATOMY)<br>O404<br>GS                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NORTH KOREA<br>1305<br>UF                   | DEMOCRATIC PEOPLES REPUBLIC OF KOREA<br>NATIONS<br>#NORTH KOREA<br>ASIA<br>% KOREA<br>SOUTH KOREA                                                                                                                                                               | NORTHROP AIRCRAFT<br>O204 3401<br>GS #NORTHROP AIRCRAFT<br>.A-9 AIRCRAFT<br>.F-5 AIRCRAFT<br>.F-18 AIRCRAFT<br>.F-20 AIRCRAFT<br>.F-89 AIRCRAFT<br>.T-38 AIRCRAFT<br>.X-21 AIRCRAFT<br>.X-21A AIRCRAFT<br>RT % AIRCRAFT         | ANATOMY<br>.FACE (ANATOMY)<br>.#NOSE (ANATOMY)<br>.RESPIRATORY SYSTEM<br>.#NOSE (ANATOMY)<br>RT HEAD (ANATOMY)<br>% NOSE<br>PARANASAL SINUSES<br>SINUSES                                                                                                                                                                                                                                                                                                                                                  |
| NORTH POLAR SPUR (ASTRONOMY)<br>3001<br>GS  | EXTRATERRESTRIAL RADIATION<br>.EXTRATERRESTRIAL RADIO WAVES<br>..GALACTIC RADIO WAVES<br>..#NORTH POLAR SPUR (ASTRONOMY)<br>..GALACTIC RADIATION<br>..GALACTIC RADIO WAVES<br>..#NORTH POLAR SPUR (ASTRONOMY)<br>NEBULAE<br>SUPERNOVA REMNANTS<br>X RAY SPECTRA | NORTHWEST TERRITORIES<br>GS NATIONS<br>.CANADA<br>.#NORTHWEST TERRITORIES<br>NORTON COUNTY ACHONDRITE<br>1806 3005<br>GS CELESTIAL BODIES<br>.METEORITES<br>.STONY METEORITES<br>...ACHONDRITES<br>...#NORTON COUNTY ACHONDRITE | NOSE CAPS<br>USE NOSE CONES<br>NOSE CONES<br>O102 3303 3501<br>UF NOSE CAPS<br>GS CONES<br>#NOSE CONES<br>..ABLATIVE NOSE CONES<br>..ROCKET NOSE CONES<br>FOREBODIES<br>.NOSES (FOREBODIES)<br>..#NOSE CONES<br>...ABLATIVE NOSE CONES<br>...ROCKET NOSE CONES<br>RT ABLATIVE MATERIALS<br>BLUNT BODIES<br>% CAPS<br>CIRCULAR CONES<br>HALF CONES<br>MISSILE COMPONENTS<br>OGIVES<br>REENTRY SHIELDING<br>REENTRY VEHICLES<br>SPACECRAFT COMPONENTS<br>SPACECRAFT SHIELDING<br>SPHERICAL CAPS<br>WARHEADS |
| NORTH SEA<br>1305<br>GS                     | SEAS<br>#NORTH SEA<br>ENGLISH CHANNEL                                                                                                                                                                                                                           | NORWAY<br>1305<br>GS NATIONS<br>#NORWAY<br>EUROPE<br>FIORDS<br>NORWEGIAN SPACE PROGRAM<br>SCANDINAVIA                                                                                                                           | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| NORTH VIETNAM<br>USE VIETNAM                |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NORTHERN HEMISPHERE<br>1304 1308 2003<br>GS | #NORTHERN HEMISPHERE<br>.ARCTIC REGIONS<br>RT % HEMISPHERES<br>NORTHERN SKY<br>SOUTHERN HEMISPHERE                                                                                                                                                              | NORWEGIAN SPACE PROGRAM<br>3409<br>GS PROGRAMS<br>.SPACE PROGRAMS<br>..EUROPEAN SPACE PROGRAMS<br>..#NORWEGIAN SPACE PROGRAM<br>RT NORWAY                                                                                       | NOSE FINS<br>O102 2806 2808<br>GS FINS<br>#NOSE FINS<br>RT CONTROL SURFACES<br>FINNED BODIES<br>NOSES (FOREBODIES)<br>VANES                                                                                                                                                                                                                                                                                                                                                                               |
| NORTHERN IRELAND<br>1305<br>GS              | NATIONS<br>.UNITED KINGDOM<br>.#NORTHERN IRELAND<br>RT EUROPE                                                                                                                                                                                                   |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NORTHERN SKY<br>1301 3001<br>RT             | ASTRONOMICAL CATALOGS<br>ASTRONOMICAL COORDINATES                                                                                                                                                                                                               | (USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW)<br>NOSE (ANATOMY)<br>NOSES (FOREBODIES)                                                                                                            | NOSE INLETS<br>O102 2806<br>GS INTAKE SYSTEMS<br>#NOSE INLETS                                                                                                                                                                                                                                                                                                                                                                                                                                             |

# NASA THESAURUS HIERARCHICAL UPDATE

RT AIR INTAKES  
 ANNULAR DUCTS  
 BYPASS RATIO  
 DUCTED BODIES  
 DUCTS  
 HYPERSONIC INLETS  
 INLET AIRFRAME CONFIGURATIONS  
 NACELLES  
 NOSES (FOREBODIES)  
 SCOOPS  
 SIDE INLETS  
 SUPERSONIC INLETS  
 % WATER INTAKES

NOSE TIPS  
 O104  
 GS TIPS  
 #NOSE TIPS  
 RT AERODYNAMIC CONFIGURATIONS  
 AIRFOIL PROFILES  
 NOSES (FOREBODIES)

NOSE WHEELS  
 O202  
 GS WHEELS  
 .VEHICLE WHEELS  
 .#NOSE WHEELS  
 RT BRAKES (FOR ARRESTING MOTION)  
 LANDING GEAR

NOSES (FOREBODIES)  
 O101 3305  
 GS FOREBODIES  
 #NOSES (FOREBODIES)  
 ...NOSE CONES  
 ...ABLATIVE NOSE CONES  
 ...ROCKET NOSE CONES  
 RT AIRCRAFT STRUCTURES  
 % NOSE

NOSE FINS  
 NOSE INLETS  
 NOSE TIPS

NOSTOC  
 O404 0409  
 GS PLANTS (BOTANY)  
 .ALGAE  
 ...BLUE GREEN ALGAE  
 ...#NOSTOC  
 .THERMOPHILIC PLANTS  
 ...BLUE GREEN ALGAE  
 ...#NOSTOC

NOTATION  
 USE CODING

NOTCH SENSITIVITY  
 1001 3203 3204  
 GS MECHANICAL PROPERTIES  
 .TOUGHNESS  
 .#NOTCH SENSITIVITY  
 SENSITIVITY  
 #NOTCH SENSITIVITY  
 CHARPY IMPACT TEST  
 FATIGUE (MATERIALS)  
 IMPACT STRENGTH  
 IMPACT TESTS

NOTCH STRENGTH  
 1704 3203  
 GS MECHANICAL PROPERTIES  
 #NOTCH STRENGTH  
 RT BRITTLENESS  
 DUCTILITY  
 FATIGUE TESTS  
 IMPACT TESTS  
 % STRENGTH  
 STRESS CONCENTRATION  
 STRESS INTENSITY FACTORS

NOTCH TESTS  
 3203 3204  
 UF NOTCHED METALS  
 GS #NOTCH TESTS  
 .CHARPY IMPACT TEST  
 RT BRITTLENESS  
 CRACK OPENING DISPLACEMENT  
 DROP TESTS  
 FATIGUE TESTS  
 HARDNESS  
 IMPACT TESTS  
 STRESS CONCENTRATION  
 % TESTS

NOTCHED METALS  
 USE NOTCH TESTS

NOTCHES  
 1502 1503 1504  
 RT CRACK OPENING DISPLACEMENT  
 PASSAGEWAYS  
 V GROOVES

NOVA COMPUTERS  
 3502  
 GS DATA PROCESSING EQUIPMENT  
 .COMPUTERS  
 ...DIGITAL COMPUTERS  
 ...MINICOMPUTERS  
 ...#NOVA COMPUTERS

NOVA LASER SYSTEM  
 1601  
 GS STIMULATED EMISSION DEVICES  
 .LASERS  
 ...HIGH POWER LASERS  
 ...#NOVA LASER SYSTEM  
 RT LASER FUSION  
 LASER OUTPUTS  
 SHIVA LASER SYSTEM  
 % SYSTEMS

NOVA LAUNCH VEHICLES  
 3103 3409  
 GS LAUNCH VEHICLES  
 #NOVA LAUNCH VEHICLES  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .#NOVA LAUNCH VEHICLES  
 RT F-1 ROCKET ENGINE  
 J-2 ENGINE  
 LIQUID PROPELLANT ROCKET ENGINES  
 M-1 ENGINE  
 % VEHICLES

NOVA SATELLITES  
 1901  
 GS ARTIFICIAL SATELLITES  
 .NAVIGATION SATELLITES  
 .#NOVA SATELLITES  
 RT DISCOS (SATELLITE ATTITUDE CONTROL)  
 TRANSIT NAVIGATION SYSTEM

NOVA SCOTIA  
 1305  
 GS NATIONS  
 .CANADA  
 .#NOVA SCOTIA

NOVAE  
 2402 2903 3001  
 GS CELESTIAL BODIES  
 .STARS  
 ...VARIABLE STARS  
 ...#NOVAE  
 ...DWARF NOVAE  
 ...HERCULES NOVA  
 RT CATAclysmic VARIABLES  
 SHOCK WAVES  
 STELLAR MASS  
 STELLAR MASS EJECTION  
 SUPERNOVAE  
 SYMBIOTIC STARS

NOVOCAIN





O207 2202 2801  
   GS NUCLEAR REACTORS  
     ..LIQUID COOLED REACTORS  
     ..WATER COOLED REACTORS  
       .#NRX REACTORS  
       .NUCLEAR RESEARCH AND TEST REACTORS  
       .#NRX REACTORS  
   RT KIWI REACTORS  
   NUCLEAR ENGINE FOR ROCKET VEHICLES  
  
 NTS  
   USE NAVIGATION TECHNOLOGY SATELLITES  
  
 NU FACTOR  
   2202 2403 2405  
   RT POISSON RATIO  
  
 NUCLEAR ASTROPHYSICS  
   2405 3002  
   GS ASTROPHYSICS  
     #NUCLEAR ASTROPHYSICS  
   NUCLEAR PHYSICS  
   #NUCLEAR ASTROPHYSICS  
  
   RT COSMOLOGY  
   NUCLEAR PARTICLES  
   STELLAR PHYSICS  
  
 NUCLEAR AUXILIARY POWER UNITS  
   O303 2201 2202  
   GS AUXILIARY POWER SOURCES  
   #NUCLEAR AUXILIARY POWER UNITS  
     ..SNAP  
     ...FISSION ELECTRIC CELLS  
       ....SNAP 2  
       ....SNAP 4  
       ....SNAP 8  
       ....SNAP 10A  
       ..SNAP 1  
       ..SNAP 3  
       ..SNAP 17  
       ..SNAP 19  
       ..SNAP 21  
       ..SNAP 23  
       ..SNAP 27  
       ..SNAP 29  
       ..SNAP 50  
       ..SPACE POWER REACTORS  
       ...FISSION ELECTRIC CELLS  
         ....SNAP 2  
         ....SNAP 4  
         ....SNAP 8  
         ....SNAP 10A  
         ....SNAP 50  
         ...SPACE POWER UNIT REACTORS  
           RT % POWER SUPPLIES  
           RADIOISOTOPE BATTERIES  
           SPACECRAFT POWER SUPPLIES  
           THERMOELECTRIC GENERATORS  
           THERMOELECTRIC POWER GENERATION  
  
     NUCLEAR BINDING ENERGY  
     2401 2403 2404 2405  
     RT ACTIVATION ENERGY  
       % ENERGY  
       IONIZATION POTENTIALS  
  
     NUCLEAR BULGE (GALAXIES)  
     USE GALACTIC BULGE  
  
     NUCLEAR CAPTURE  
       O710 2401 2402 2403 2405  
       GS NUCLEAR REACTIONS  
       .NUCLEAR INTERACTIONS  
       .#NUCLEAR CAPTURE  
       ...ELECTRON CAPTURE  
  
     SPACE POWER REACTORS  
     ...FISSION ELECTRIC CELLS  
       ..SNAP 2  
       ....SNAP 4  
       ....SNAP 29  
       ....SNAP 50  
       ..SPACE POWER REACTORS  
  
     PARTICLE INTERACTIONS  
     .ELEMENTARY PARTICLE INTERACTIONS  
     .#NUCLEAR CAPTURE  
     ...ELECTRON CAPTURE  
     .NUCLEAR INTERACTIONS  
     .#NUCLEAR CAPTURE  
     ...ELECTRON CAPTURE  
     ACTIVATION ENERGY  
     CAPTURE EFFECT  
     ELECTRON TRANSITIONS  
     ENERGY LEVELS  
     % INTERACTIONS  
     IRRADIATION  
     SPIN  
     TRANSITION PROBABILITIES  
  
     NUCLEAR CHEMISTRY  
     O603 2405  
     RT ATOMIC STRUCTURE  
       % CHEMISTRY  
       ISOMERS  
       % NUCLEAR ENERGY  
       PHYSICAL CHEMISTRY  
       PLASMA CHEMISTRY  
       QUANTUM CHEMISTRY  
       RADIOCHEMISTRY  
  
     NUCLEAR DEFORMATION  
     2405  
     GS DEFORMATION  
       #NUCLEAR DEFORMATION  
  
     NUCLEAR DEVICES  
     2202  
     GS EXPLOSIVE DEVICES  
       #NUCLEAR DEVICES  
     RT % DEVICES  
       FISSION WEAPONS  
       THERMONUCLEAR EXPLOSIONS  
       WARHEADS  
  
     NUCLEAR ELECTRIC POWER GENERATION  
     2201 2204 2301 2405  
     UF NUCLEAR POWER GENERATION  
     GS #NUCLEAR ELECTRIC POWER GENERATION  
       .NUCLEAR AUXILIARY POWER UNITS  
       ..SNAP  
       ...FISSION ELECTRIC CELLS  
       ....SNAP 2  
       ....SNAP 4  
       ....SNAP 8  
       ....SNAP 10A  
       ....SNAP 1  
       ....SNAP 3  
       ....SNAP 7  
  
     NUCLEAR ELECTRIC POWER GENERATION  
     2201 2204 2301 2405  
     UF NUCLEAR POWER GENERATION  
     GS #NUCLEAR ELECTRIC POWER GENERATION  
       .NUCLEAR AUXILIARY POWER UNITS  
       ..SNAP  
       ...FISSION ELECTRIC CELLS  
       ....SNAP 2  
       ....SNAP 4  
       ....SNAP 8  
       ....SNAP 10A  
       ....SNAP 1  
       ....SNAP 3  
       ....SNAP 7

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... SNAP 9A
... SNAP 11
... SNAP 13
... SNAP 15
... SNAP 17
... SNAP 19
... SNAP 21
... SNAP 23
... SNAP 27
... SNAP 29
... SNAP 50
... SPACE POWER REACTORS
... FISSION ELECTRIC CELLS
... SNAP 2
... SNAP 4
... SNAP 8
... SNAP 10A
... SNAP 50
... SPACE POWER UNIT REACTORS
... NUCLEAR POWER PLANTS
... ENRICO FERMI ATOMIC POWER PLANT
... HALLAM NUCLEAR POWER FACILITY
... ML-1 NUCLEAR POWER PLANT
... NUCLEAR POWER REACTORS
... KIWI REACTORS
... KIWI B REACTORS
... KIWI B-1 REACTOR
... KIWI B-4 REACTOR
... PATHFINDER NUCLEAR REACTOR
... PLUTONIUM RECYCLE TEST REACTOR
... SPACE POWER REACTORS
... FISSION ELECTRIC CELLS
... SNAP 2
... SNAP 4
... SNAP 8
... SNAP 10A
... SPACE POWER UNIT REACTORS
... TORY 2 REACTOR
... TORY 2-A REACTOR
... TORY 2-C REACTOR
... THERMONUCLEAR POWER GENERATION
RT ELECTRIC GENERATORS
% NUCLEAR ENERGY
RT
NUCLEAR ELECTRIC PROPULSION
2201 2702 2803
GS PROPULSION
. NUCLEAR PROPULSION
. #NUCLEAR ELECTRIC PROPULSION
RT ELECTRIC PROPULSION
ELECTROTHERMAL ENGINES
ION PROPULSION
MARINE PROPULSION
PLASMA PROPULSION
SPACECRAFT PROPULSION

... SNAP 9A
... SNAP 11
... SNAP 13
... SNAP 15
... SNAP 17
... SNAP 19
... SNAP 21
... SNAP 23
... SNAP 27
... SNAP 29
... SNAP 50
... SPACE POWER REACTORS
... FISSION ELECTRIC CELLS
... SNAP 2
... SNAP 4
... SNAP 8
... SNAP 10A
... SNAP 50
... SPACE POWER UNIT REACTORS
... NUCLEAR POWER PLANTS
... ENRICO FERMI ATOMIC POWER PLANT
... HALLAM NUCLEAR POWER FACILITY
... ML-1 NUCLEAR POWER PLANT
... NUCLEAR POWER REACTORS
... KIWI REACTORS
... KIWI B REACTORS
... KIWI B-1 REACTOR
... KIWI B-4 REACTOR
... PATHFINDER NUCLEAR REACTOR
... PLUTONIUM RECYCLE TEST REACTOR
... SPACE POWER REACTORS
... FISSION ELECTRIC CELLS
... SNAP 2
... SNAP 4
... SNAP 8
... SNAP 10A
... SPACE POWER UNIT REACTORS
... TORY 2 REACTOR
... TORY 2-A REACTOR
... TORY 2-C REACTOR
... THERMONUCLEAR POWER GENERATION
RT ELECTRIC GENERATORS
% NUCLEAR ENERGY
RT
NUCLEAR ELECTRIC PROPULSION
2201 2702 2803
GS PROPULSION
. NUCLEAR PROPULSION
. #NUCLEAR ELECTRIC PROPULSION
RT ELECTRIC PROPULSION
ELECTROTHERMAL ENGINES
ION PROPULSION
MARINE PROPULSION
PLASMA PROPULSION
SPACECRAFT PROPULSION

NUCLEAR EMULSIONS
O605 1407
GS MIXTURES
. DISPERSIONS
. EMULSIONS
... PHOTOGRAPHIC EMULSIONS
... #NUCLEAR EMULSIONS
. SOLUTIONS
... PHOTOGRAPHIC EMULSIONS
... #NUCLEAR EMULSIONS
RT DOSIMETERS
RADIATION COUNTERS
RADIATION MEASURING INSTRUMENTS
% NUCLEAR ENERGY
O303 2205 2405
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
UF ATOMIC ENERGY
RT ANNUAL CORE PULSE REACTORS
ATOMIC THEORY
CHEMICAL ENERGY
ENERGY POLICY
ENERGY STORAGE
MOLECULAR ENERGY LEVELS
NUCLEAR CHEMISTRY
NUCLEAR ELECTRIC POWER GENERATION
NUCLEAR FISSION
NUCLEAR FUELS
NUCLEAR FUSION
NUCLEAR HEAT
NUCLEAR PHYSICS
NUCLEAR PROPULSION
NUCLEAR REACTORS
NUCLEAR RESEARCH
NUCLEAR WARFARE
NUCLEONICS
SPENT FUELS
NUCLEAR ENGINE FOR ROCKET VEHICLES
2202 2204 2405 2808
UF NERVA (ENGINE)
GS ENGINES
. ROCKET ENGINES
. #NUCLEAR ENGINE FOR ROCKET
VEHICLES
RT BOOSTER ROCKET ENGINES
KIWI REACTORS
NRX REACTORS
PHOEBUS NUCLEAR REACTOR
ROVER PROJECT
SUSTAINER ROCKET ENGINES

% VEHICLES
WATER COOLED REACTORS
NUCLEAR EXPLOSION EFFECT
2405
RT % EFFECTS
FALLOUT
RADIATION EFFECTS
RADIATION HAZARDS
NUCLEAR EXPLOSIONS
2205 2405 3302 3401
UF ATOMIC EXPLOSIONS
GS EXPLOSIONS
#NUCLEAR EXPLOSIONS
... THERMONUCLEAR EXPLOSIONS
RT AERIAL EXPLOSIONS
ARTIFICIAL RADIATION BELTS
CIVIL DEFENSE
CRATERING
FALLOUT
% FIREBALLS
FISHBOWL OPERATION
HIGH ENERGY INTERACTIONS
RADIATION HAZARDS
UNDERGROUND EXPLOSIONS
UNDERWATER EXPLOSIONS
VELA SATELLITES
NUCLEAR FISSION
2405
GS NUCLEAR REACTIONS
#NUCLEAR FISSION
RT CRITICAL EXPERIMENTS
CRITICAL MASS
DECAY
FISSION PRODUCTS
FUSION REACTORS
FUSION-FISSION HYBRID REACTORS
HIGH ENERGY INTERACTIONS
NEUTRON FLUX DENSITY
% NUCLEAR ENERGY
RADIOACTIVE DECAY
RADIOACTIVE MATERIALS
SUBCRITICAL MASS
NUCLEAR FUEL BURNUP
2202 2203 2204
GS COMBUSTION
. FUEL COMBUSTION
. #NUCLEAR FUEL BURNUP
RT CRITICAL MASS
REACTOR PHYSICS
REACTOR TECHNOLOGY

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NUCLEAR FUEL ELEMENTS
2202 2203
UF FUEL ELEMENTS (NUCLEAR REACTORS)
RT ANNUAL CORE PULSE REACTORS
% ELEMENTS
FUELS
PLUTONIUM ALLOYS
REACTOR CORES
REACTOR MATERIALS
URANIUM ALLOYS
URANIUM CARBIDES

NUCLEAR FUEL REPROCESSING
2202
GS RECLAMATION
.MATERIALS RECOVERY
.#NUCLEAR FUEL REPROCESSING
RT NUCLEAR FUELS
% PROCESSING
% RECOVERY
RECYCLING
SPENT FUELS

NUCLEAR FUELS
2202 2203 2405
UF REACTOR FUELS
GS FUELS
#NUCLEAR FUELS
..CERAMIC NUCLEAR FUELS
..FISSION
..SPENT FUELS
RT ANNUAL CORE PULSE REACTORS
DEUTERIUM
ENERGY POLICY
FISSILE FUELS
FISSION
FISSIONABLE MATERIALS
FUEL CAPSULES
FUEL PRODUCTION
INERTIAL FUSION (REACTOR)
MIXED OXIDES
NEUTRON SOURCES
% NUCLEAR ENERGY
NUCLEAR FUEL REPROCESSING
PELLETS
PLUTONIUM
PLUTONIUM ALLOYS
PLUTONIUM COMPOUNDS
REACTOR CORES
REACTOR MATERIALS
REACTOR STARTUP TESTS
SOL-GEL PROCESSES
THORIUM
THORIUM ALLOYS
THORIUM COMPOUNDS

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969

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ..RADIOBIOLOGY<br>ANTIRADIATION DRUGS<br>HEALTH PHYSICS<br>% RADIATION<br>RADIOPATHOLOGY | NUCLEAR ASTROPHYSICS<br>NUCLEON POTENTIAL<br>NUCLEON-NUCLEON SCATTERING<br>PARTICLE ACCELERATORS<br>PARTICLE TRACKS<br>PHOTONEUTRONS<br>PI-ELECTRONS<br>POSITRON ANNIHILATION<br>PROTON RESONANCE<br>PROTONS                                                                                                                                                                                | GS | NUCLEAR ELECTRIC POWER GENERATION<br>#NUCLEAR POWER REACTORS<br>..KIWI REACTORS<br>...KIWI B REACTORS<br>...KIWI B-1 REACTOR<br>...KIWI B-4 REACTOR<br>...PATHFINDER NUCLEAR REACTOR<br>...PLUTONIUM RECYCLE TEST REACTOR<br>...SPACE POWER REACTORS<br>...FISSION ELECTRIC CELLS<br>...SNAP 2<br>...SNAP 4<br>...SNAP 8<br>...SNAP 10A<br>...SPACE POWER UNIT REACTORS<br>...TORY 2 REACTOR<br>...TORY 2-A REACTOR<br>...TORY 2-C REACTOR<br>NUCLEAR REACTORS<br>#NUCLEAR POWER REACTORS<br>..KIWI REACTORS<br>...KIWI B REACTORS<br>...KIWI B-1 REACTOR<br>...KIWI B-4 REACTOR<br>...PATHFINDER NUCLEAR REACTOR<br>...PLUTONIUM RECYCLE TEST REACTOR<br>...SPACE POWER REACTORS<br>...FISSION ELECTRIC CELLS<br>...SNAP 2<br>...SNAP 4<br>...SNAP 8<br>...SNAP 10A<br>...SPACE POWER UNIT REACTORS<br>...TORY 2 REACTOR<br>...TORY 2-A REACTOR<br>...TORY 2-C REACTOR |
| NUCLEAR METEOROLOGY<br>2003 2405<br>GS<br>METEOROLOGY<br>#NUCLEAR METEOROLOGY<br>RT<br>FALLOUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                          | NUCLEAR PHYSICS<br>2405<br>GS #NUCLEAR PHYSICS<br>..NUCLEAR ASTROPHYSICS<br>..REACTOR PHYSICS<br>RT ATOMIC STRUCTURE<br>CURRENT ALGEBRA<br>ELECTROMAGNETIC ABSORPTION<br>FIELD THEORY (PHYSICS)<br>HEALTH PHYSICS<br>% NUCLEAR ENERGY<br>NUCLEONICS<br>PARITY<br>PARTICLE SPIN<br>% PHYSICS<br>% QUANTUM THEORY<br>% SCIENCE<br>THEORETICAL PHYSICS                                         | RT | BOILING WATER REACTORS<br>BREEDER REACTORS<br>FAST NUCLEAR REACTORS<br>FAST OXIDE REACTORS<br>HIGH TEMPERATURE GAS COOLED REACTORS<br>LIQUID METAL FAST BREEDER REACTORS<br>POWER REACTORS<br>PRESSURIZED WATER REACTORS<br>SNAP<br>SODIUM GRAPHITE REACTORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| NUCLEAR MODELS<br>O603 2401 2404 2405<br>GS MODELS<br>#NUCLEAR MODELS<br>RT ATOMIC STRUCTURE<br>ENERGY LEVELS<br>MOLECULAR STRUCTURE<br>QUARK PARTON MODEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                          | NUCLEAR POTENTIAL<br>2403 2405<br>GS POTENTIAL ENERGY<br>#NUCLEAR POTENTIAL<br>RT NUCLEON POTENTIAL                                                                                                                                                                                                                                                                                         | RT | NUCLEAR POWER REACTORS<br>BREEDER REACTORS<br>FAST NUCLEAR REACTORS<br>FAST OXIDE REACTORS<br>HIGH TEMPERATURE GAS COOLED REACTORS<br>LIQUID METAL FAST BREEDER REACTORS<br>POWER REACTORS<br>PRESSURIZED WATER REACTORS<br>SNAP<br>SODIUM GRAPHITE REACTORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| NUCLEAR PARTICLES<br>2403 2405 2903<br>GS PARTICLES<br>#NUCLEAR PARTICLES<br>...ANTIPARTICLES<br>...ANTINEUTRINOS<br>...ANTINUCLEONS<br>...ANTIPROTONS<br>...POSITRONS<br>...BETA PARTICLES<br>...BOSONS<br>...ALPHA PARTICLES<br>...MESONS<br>...ETA-MESONS<br>...KAONS<br>...MESON RESONANCE<br>...X MESONS<br>...MUONS<br>...PIONS<br>...VECTOR MESONS<br>...RHO-MESONS<br>...SIGMA-MESONS<br>...PHOTONS<br>...XI HYPERONS<br>...NUCLEONS<br>...PHOTOELECTRONS<br>CORPUSCULAR RADIATION<br>COSMIC RAYS<br>ELEMENTARY PARTICLES<br>FISSION PRODUCTS<br>GAMMA RAY BURSTS<br>NEUTRON CROSS SECTIONS<br>NEUTRON DISTRIBUTION<br>NEUTRON SCATTERING |                                                                                          | NUCLEAR POWER PLANTS<br>2203 2204<br>GS ELECTRIC POWER PLANTS<br>#NUCLEAR POWER PLANTS<br>..ENRICO FERMI ATOMIC POWER PLANT<br>..HALLAM NUCLEAR POWER FACILITY<br>..ML-1 NUCLEAR POWER PLANT<br>NUCLEAR ELECTRIC POWER GENERATION<br>#NUCLEAR POWER PLANTS<br>..ENRICO FERMI ATOMIC POWER PLANT<br>..HALLAM NUCLEAR POWER FACILITY<br>..ML-1 NUCLEAR POWER PLANT<br>RT PLASMA CORE REACTORS | RT | NUCLEAR POWERED SHIPS<br>3401<br>GS SURFACE VEHICLES<br>#NUCLEAR POWERED SHIPS<br>..SAVANNAH NUCLEAR SHIP<br>WATER VEHICLES<br>. SHIPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

# NASA THESAURUS HIERARCHICAL UPDATE

RT    .#NUCLEAR POWERED SHIPS  
       ...SAVANNAH NUCLEAR SHIP  
       AIRCRAFT CARRIERS  
       CARGO SHIPS  
       NAVY  
       SUBMARINES

NUCLEAR PROPELLED AIRCRAFT  
 0207 2202 2801  
 RT   % AIRCRAFT  
       % MILITARY AIRCRAFT  
       RESEARCH AIRCRAFT

NUCLEAR PROPULSION  
 2202 2204 2405  
 UF   CHEMONUCLEAR PROPULSION  
       THERMONUCLEAR PROPULSION  
 GS   PROPULSION  
       #NUCLEAR PROPULSION  
       ..NUCLEAR ELECTRIC PROPULSION  
       AIRCRAFT ENGINES  
       GASEOUS FISSION REACTORS  
       HIGH TEMPERATURE NUCLEAR REACTORS  
       HIGH TEMPERATURE PROPELLANTS  
       MARINE PROPULSION  
       MATTER-ANTIMATTER PROPULSION  
       MERCURY ION ENGINES  
       NEW MOONS PROJECT  
       % NUCLEAR ENERGY  
       ROVER PROJECT  
       SAVANNAH NUCLEAR SHIP  
       SPACECRAFT PROPULSION  
       TRIDENT SUBMARINE  
       UNDERWATER PROPULSION

NUCLEAR PUMPED LASERS  
 1601  
 GS   STIMULATED EMISSION DEVICES  
       .LASERS  
       .#NUCLEAR PUMPED LASERS  
 RT   OPTICAL PUMPING  
       OPTICAL RESONANCE

NUCLEAR PUMPING  
 1601 2202  
 RT   ELECTRON PUMPING  
       ENERGY TRANSFER  
       FISSION PRODUCTS  
       GAS LASERS  
       LASERS  
       OPTICAL PUMPING  
       POPULATION INVERSION  
       % PUMPING  
       STIMULATED EMISSION  
       STIMULATED EMISSION DEVICES

NUCLEAR QUADRUPOLE RESONANCE  
 2307 2401 2402 2405  
 GS   RESONANCE  
       #NUCLEAR QUADRUPOLE RESONANCE  
 RT   ENERGY LEVELS  
       QUADRUPOLES

NUCLEAR RADIATION  
 2402 2403 2405  
 GS   #NUCLEAR RADIATION  
       .BETA PARTICLES  
       .FAST NEUTRONS  
       .GAMMA RAY BEAMS  
       .GAMMA RAYS  
       ..GAMMA RAY BURSTS  
       .NEUTRON BEAMS  
       .PHOTONEUTRONS  
       .POST-BLAST NUCLEAR RADIATION  
       .SPALLATION  
       .THERMAL NEUTRONS  
       ALPHA PARTICLES  
       BREMSSTRAHLUNG  
       CERENKOV RADIATION  
       CORPUSCULAR RADIATION  
       ELECTROMAGNETIC RADIATION  
       ELECTRON PUMPING  
       ELECTRON RADIATION  
       ELECTRONS  
       ELEMENTARY PARTICLES  
       EMISSION SPECTRA  
       FISSION PRODUCTS  
       GAMMA RAY ABSORPTION  
       HEALTH PHYSICS  
       HIGH ENERGY INTERACTIONS  
       IONIZING RADIATION  
       IRRADIATION  
       NEUTRONS  
       PARTICLE PRODUCTION  
       PHOTONS  
       % RADIATION  
       RADIATION EFFECTS  
       RADIATION HAZARDS  
       RADIOACTIVE CONTAMINANTS  
       RADIOACTIVE DECAY  
       RADIOACTIVE MATERIALS  
       RADIOACTIVITY  
       RADIOBIOLOGY  
       RADIOCHEMISTRY  
       VELA SATELLITES

RT    NUCLEAR RADIATION  
       ..NUCLEAR INTERACTIONS  
       ..NUCLEAR CAPTURE  
       ..ELECTRON CAPTURE  
       ..SPIN-ORBIT INTERACTIONS  
       ..ELECTRON CAPTURE  
       ..WEAK INTERACTIONS (FIELD THEORY)  
       ..NUCLEAR SCATTERING  
       ..NEUTRON SCATTERING  
       ..RESONANCE SCATTERING  
       ..NUCLEAR TRANSFORMATIONS  
       ..TRANSUTATION  
       ..PHOTONUCLEAR REACTIONS  
       ..PROTON SCATTERING  
       ..PROTON-PROTON REACTIONS  
       ..RADIOACTIVE DECAY  
       ..ALPHA DECAY  
       ..NEUTRON EMISSION  
       ..SPALLATION  
       ..THERMONUCLEAR REACTIONS  
       ..NUCLEAR FUSION  
       ...CONTROLLED FUSION  
       BRAGG CURVE  
       COMPTON EFFECT  
       CRITICAL EXPERIMENTS  
       CRITICAL MASS  
       ELECTRON SCATTERING  
       EMISSION  
       HALF LIFE  
       HIGH ENERGY INTERACTIONS  
       INHOURL EQUATION  
       % INTERACTIONS  
       INTERNAL CONVERSION  
       PAIR PRODUCTION  
       PARTICLE INTERACTIONS  
       PARTICLE PRODUCTION  
       PHOTONEUTRONS  
       POISONING (REACTION INHIBITION)

RT    NUCLEAR REACTIONS  
       2202 2205 2405 3001  
       UF   NEUTRON TRANSMUTATION  
       GS   #NUCLEAR REACTIONS  
       ..NUCLEAR FISSION  
       ..NUCLEAR INTERACTIONS  
       ..NUCLEAR CAPTURE  
       ..ELECTRON CAPTURE  
       ..SPIN-ORBIT INTERACTIONS  
       ..ELECTRON CAPTURE  
       ..WEAK INTERACTIONS (FIELD THEORY)  
       ..NUCLEAR SCATTERING  
       ..NEUTRON SCATTERING  
       ..RESONANCE SCATTERING  
       ..NUCLEAR TRANSFORMATIONS  
       ..TRANSUTATION  
       ..PHOTONUCLEAR REACTIONS  
       ..PROTON SCATTERING  
       ..PROTON-PROTON REACTIONS  
       ..RADIOACTIVE DECAY  
       ..ALPHA DECAY  
       ..NEUTRON EMISSION  
       ..SPALLATION  
       ..THERMONUCLEAR REACTIONS  
       ..NUCLEAR FUSION  
       ...CONTROLLED FUSION  
       BRAGG CURVE  
       COMPTON EFFECT  
       CRITICAL EXPERIMENTS  
       CRITICAL MASS  
       ELECTRON SCATTERING  
       EMISSION  
       HALF LIFE  
       HIGH ENERGY INTERACTIONS  
       INHOURL EQUATION  
       % INTERACTIONS  
       INTERNAL CONVERSION  
       PAIR PRODUCTION  
       PARTICLE INTERACTIONS  
       PARTICLE PRODUCTION  
       PHOTONEUTRONS  
       POISONING (REACTION INHIBITION)

POMERONS  
 RADIATION ABSORPTION  
 RADIOGENIC MATERIALS  
 % REACTION  
 REACTION KINETICS  
 REACTIVITY  
 SOLAR NEUTRINOS  
 STRONG INTERACTIONS (FIELD THEORY)  
 SUBCRITICAL MASS  
  
 NUCLEAR REACTOR CONTROL  
 2202 2204 3404  
 RT CONFINEMENT  
 % CONTROL  
 % CONTROL RODS  
 % REACTION CONTROL  
 REACTOR SAFETY  
  
 NUCLEAR REACTORS  
 2203 2204  
 GS #NUCLEAR REACTORS  
 .ANNULAR CORE PULSE REACTORS  
 .ASTRON THERMONUCLEAR REACTOR  
 .BREEDER REACTORS  
 ..EXPERIMENTAL BREEDER REACTOR 1  
 ..EXPERIMENTAL BREEDER REACTOR 2  
 ..LIGHT WATER BREEDER REACTORS  
 ..LIQUID METAL FAST BREEDER REACTORS  
 .ENGINEERING TEST REACTORS  
 .FAST NUCLEAR REACTORS  
 ..EXPERIMENTAL BREEDER REACTOR 1  
 ..EXPERIMENTAL BREEDER REACTOR 2  
 ..FAST OXIDE REACTORS  
 ..FAST TEST REACTORS  
 ..GAS COOLED FAST REACTORS  
 ..LIQUID METAL FAST BREEDER REACTORS  
 .FUSION REACTORS  
 ..HELIOFUSION  
 ..SPHEROMAKS  
 ..STELLARATORS  
 .FUSION-FISSION HYBRID REACTORS  
 .GAS COOLED REACTORS  
 ..EXPERIMENTAL GAS COOLED REACTORS  
 ..GAS COOLED FAST REACTORS  
 ..HIGH TEMPERATURE NUCLEAR REACTORS  
 ..HIGH TEMPERATURE GAS COOLED REACTORS  
 ..KIWI REACTORS  
 ...KIWI B REACTORS  
 ...KIWI B-1 REACTOR  
 ...KIWI B-4 REACTOR  
 ...KIWI B-4 REACTOR  
 ...TORY 2 REACTOR  
 ..TORY 2-A REACTOR

..TORY 2-C REACTOR  
 .GASEOUS FISSION REACTORS  
 .HANFORD REACTORS  
 .HIGH FLUX ISOTOPE REACTORS  
 .LIQUID COOLED REACTORS  
 ..LIQUID METAL COOLED REACTORS  
 ...ADVANCED SODIUM COOLED REACTOR  
 ...EXPERIMENTAL BREEDER REACTOR 1  
 ...EXPERIMENTAL BREEDER REACTOR 2  
 ...LITHIUM COOLED REACTOR  
 ..EXPERIMENT  
 ...LOS ALAMOS MOLTON PLUTONIUM REACTOR  
 ...MILITARY COMPACT REACTORS  
 ...SODIUM GRAPHITE REACTORS  
 ...SODIUM REACTOR EXPERIMENT  
 ...ORGANIC COOLED REACTORS  
 ...EXPERIMENTAL ORGANIC COOLED REACTORS  
 ..WATER COOLED REACTORS  
 ...BOILING WATER REACTORS  
 ...EXPERIMENTAL BOILING WATER REACTORS  
 ....HALDEN BOILING WATER REACTOR  
 ....LOS ALAMOS WATER BOILER REACTOR  
 ....PATHFINDER NUCLEAR REACTOR  
 ....SPERT REACTORS  
 ....HEAVY WATER REACTORS  
 ....HEAVY WATER COMPONENTS TEST REACTORS  
 ..PLUTONIUM RECYCLE TEST REACTOR  
 ....ZERO POWER REACTOR 2  
 ...LIGHT WATER REACTORS  
 ...NRX REACTORS  
 ...PLUM BROOK REACTOR  
 ...PRESSURIZED WATER REACTORS  
 ...SPECTRAL SHIFT CONTROL REACTOR  
 ...SWIMMING POOL REACTORS  
 ....ZERO POWER REACTORS  
 ....ZERO POWER REACTOR 2  
 ....ZERO POWER REACTOR 3  
 ....ZERO POWER REACTOR 6  
 ....ZERO POWER REACTOR 9  
 ...MOLTON SALT NUCLEAR REACTORS  
 .NUCLEAR POWER REACTORS  
 ..KIWI REACTORS  
 ....KIWI B REACTORS  
 ....KIWI B-1 REACTOR  
 ....KIWI B-4 REACTOR  
 ...PATHFINDER NUCLEAR REACTOR  
 ..PLUTONIUM RECYCLE TEST REACTOR  
 ...SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ....SNAP 2  
 ....SNAP 4

....SNAP 8  
 ....SNAP 10A  
 ...SPACE POWER UNIT REACTORS  
 ..TORY 2 REACTOR  
 ..TORY 2-A REACTOR  
 ..TORY 2-C REACTOR  
 .NUCLEAR RESEARCH AND TEST REACTORS  
 ..ADVANCED TEST REACTORS  
 ..EXPERIMENTAL BOILING WATER REACTORS  
 ..EXPERIMENTAL BREEDER REACTOR 1  
 ..EXPERIMENTAL BREEDER REACTOR 2  
 ..EXPERIMENTAL GAS COOLED REACTORS  
 ..EXPERIMENTAL ORGANIC COOLED REACTORS  
 ..HEALTH PHYSICS RESEARCH REACTOR  
 ..HEAVY WATER COMPONENTS TEST REACTORS  
 ..HERO REACTOR  
 ..HIGH TEMPERATURE NUCLEAR REACTORS  
 ..JANUS REACTOR  
 ..KIWI REACTORS  
 ...KIWI B REACTORS  
 ...KIWI B-1 REACTOR  
 ...KIWI B-4 REACTOR  
 ...LIVERMORE POOL TYPE REACTOR  
 ...LOS ALAMOS MOLTON PLUTONIUM REACTOR  
 ..MILITARY COMPACT REACTORS  
 ..NRX REACTORS  
 ..PLUM BROOK REACTOR  
 ..PLUTONIUM RECYCLE TEST REACTOR  
 ..SODIUM REACTOR EXPERIMENT  
 ..SPERT REACTORS  
 ..TORY 2 REACTOR  
 ..TORY 2-A REACTOR  
 ..TORY 2-C REACTOR  
 ..TOWER SHIELDING REACTOR 2  
 ..ZERO POWER REACTOR 2  
 ..ZERO POWER REACTOR 3  
 ..ZERO POWER REACTOR 6  
 ..ZERO POWER REACTOR 9  
 ..ORGANIC MODERATED REACTORS  
 ..EXPERIMENTAL ORGANIC COOLED REACTORS  
 .PEBBLE BED REACTORS  
 .PHOEBUS NUCLEAR REACTOR  
 .PLASMA CORE REACTORS  
 .PLUTO REACTORS  
 .THERMAL REACTORS  
 .TOKAMAK DEVICES  
 ..JOINT EUROPEAN TORUS  
 ..WATER MODERATED REACTORS  
 ..EXPERIMENTAL BOILING WATER REACTORS

# NASA THESAURUS HIERARCHICAL UPDATE

..HEAVY WATER COMPONENTS TEST  
 REACTORS  
 ..PLUTONIUM RECYCLE TEST REACTOR  
 RT  
 CLOSED CYCLES  
 CONTROL RODS  
 COOLANTS  
 FISSILE FUELS  
 HIGH FLUX BEAM REACTORS  
 INHOUR EQUATION  
 LOSS OF COOLANT  
 MODERATORS  
 % NUCLEAR ENERGY  
 % PILES  
 RADIATION SHIELDING  
 REACTOR CORES  
 REACTOR DESIGN  
 REACTOR MATERIALS  
 REACTOR PHYSICS  
 REACTOR SAFETY  
 REACTOR STARTUP TESTS  
 REACTOR TECHNOLOGY  
 % REACTORS  
 ROVER PROJECT  
 THERMAL NEUTRONS  
 THERMAL POLLUTION  
 NUCLEAR RELAXATION  
 1203 2404  
 RT RELAXATION (MECHANICS)  
 NUCLEAR RESEARCH  
 2204 2405 3404  
 GS RESEARCH  
 #NUCLEAR RESEARCH  
 RT HIGH ENERGY INTERACTIONS  
 LABORATORIES  
 % NUCLEAR ENERGY  
 PLASMA CORE REACTORS  
 RADIOCHEMISTRY  
 NUCLEAR RESEARCH AND TEST REACTORS  
 1108 2202 2204 3404  
 UF MATERIALS TESTING REACTORS  
 NUCLEAR TEST REACTORS  
 PHYSICAL CONSTANTS TESTING REACTOR  
 GS NUCLEAR REACTORS  
 #NUCLEAR RESEARCH AND TEST REACTORS  
 ..ADVANCED TEST REACTORS  
 ..EXPERIMENTAL BOILING WATER  
 REACTORS  
 ..EXPERIMENTAL BREEDER REACTOR 1  
 ..EXPERIMENTAL BREEDER REACTOR 2  
 ..EXPERIMENTAL GAS COOLED REACTORS  
 ..EXPERIMENTAL ORGANIC COOLED  
 REACTORS

..HEALTH PHYSICS RESEARCH REACTOR  
 ..HEAVY WATER COMPONENTS TEST  
 REACTORS  
 ..HERO REACTOR  
 ..HIGH TEMPERATURE NUCLEAR REACTORS  
 ..JANUS REACTOR  
 ..KIWI REACTORS  
 ..KIWI B REACTORS  
 ....KIWI B-1 REACTOR  
 ....KIWI B-4 REACTOR  
 ..LIVERMORE POOL TYPE REACTOR  
 ..LOS ALAMOS MOLTEN PLUTONIUM  
 REACTOR  
 ..MILITARY COMPACT REACTORS  
 ..NRX REACTORS  
 ..PLUM BROOK REACTOR  
 ..PLUTONIUM RECYCLE TEST REACTOR  
 ..SODIUM REACTOR EXPERIMENT  
 ..SPERT REACTORS  
 ..TORY 2 REACTOR  
 ..TORY 2-A REACTOR  
 ..TORY 2-C REACTOR  
 ..TOWER SHIELDING REACTOR 2  
 ..ZERO POWER REACTOR 2  
 ..ZERO POWER REACTOR 3  
 ..ZERO POWER REACTOR 6  
 ..ZERO POWER REACTOR 9  
 ..ZERO POWER REACTORS  
 BOILING WATER REACTORS  
 NEUTRON SOURCES  
 REACTOR DESIGN  
 REACTOR TECHNOLOGY  
 % REACTORS  
 TRANSIENT REACTOR TEST FACILITY  
 NUCLEAR ROCKET ENGINES  
 2204 2405 3106  
 UF THERMIONIC REACTORS  
 GS ENGINES  
 .ROCKET ENGINES  
 .#NUCLEAR ROCKET ENGINES  
 ...NUCLEAR LIGHTBULB ENGINES  
 BOOSTER ROCKET ENGINES  
 ION ENGINES  
 MERCURY ION ENGINES  
 PHOEBUS NUCLEAR REACTOR  
 PLUTO REACTORS  
 RESTARTABLE ROCKET ENGINES  
 % ROCKETS  
 SUSTAINER ROCKET ENGINES  
 NUCLEAR SCATTERING  
 2402 2403 2405  
 SN (SCATTERING CAUSED BY NUCLEUS AND  
 NOT BY ORBITAL ELECTRONS)  
 GS NUCLEAR REACTIONS

#NUCLEAR SCATTERING  
 ..NEUTRON SCATTERING  
 ..RESONANCE SCATTERING  
 SCATTERING  
 #NUCLEAR SCATTERING  
 ..NEUTRON SCATTERING  
 ..RESONANCE SCATTERING  
 ANGULAR DISTRIBUTION  
 BACKSCATTERING  
 COHERENT SCATTERING  
 ELASTIC SCATTERING  
 ELECTRON SCATTERING  
 FORWARD SCATTERING  
 INCOHERENT SCATTERING  
 INELASTIC SCATTERING  
 MANDELSTAM REPRESENTATION  
 RT  
 NUCLEAR SHIELDING  
 USE RADIATION SHIELDING  
 NUCLEAR SPIN  
 2307 2405  
 GS SPIN  
 .PARTICLE SPIN  
 .#NUCLEAR SPIN  
 ELECTRON SPIN  
 ENERGY LEVELS  
 KONDO EFFECT  
 MAGNETIC RESONANCE  
 OVERHAUSER EFFECT  
 QUANTUM NUMBERS  
 QUANTUM THEORY  
 NUCLEAR STRUCTURE  
 2401 2405  
 RT ENERGY LEVELS  
 EVEN-EVEN NUCLEI  
 ODD-ODD NUCLEI  
 NUCLEAR TEST REACTORS  
 USE NUCLEAR RESEARCH AND TEST REACTORS  
 NUCLEAR TRANSFORMATIONS  
 2405  
 GS NUCLEAR REACTIONS  
 #NUCLEAR TRANSFORMATIONS  
 ..TRANSUTMUTATION  
 NUCLEAR VULNERABILITY  
 1702  
 GS VULNERABILITY  
 #NUCLEAR VULNERABILITY  
 PENETRATION  
 RADIATION EFFECTS  
 THERMONUCLEAR EXPLOSIONS

|                               |                                 |                             |
|-------------------------------|---------------------------------|-----------------------------|
| NUCLEAR WARFARE               | HEAT TRANSFER                   | NUCLEI (NUCLEAR PHYSICS)    |
| 2205 2405 3401                | HEAT TRANSFER COEFFICIENTS      | 2401 2405 2903              |
| GS                            | NUCLEATION                      | GS                          |
| WARFARE                       |                                 | PARTICLES                   |
| #NUCLEAR WARFARE              | NUCLEATION                      | .CHARGED PARTICLES          |
| RT                            | 0602 0603 2401 2601             | ..ENERGETIC PARTICLES       |
| CIVIL DEFENSE                 | GS                              | ..#NUCLEI (NUCLEAR PHYSICS) |
| HARDENING (SYSTEMS)           | .CLOUD SEEDING                  | ....EVEN-EVEN NUCLEI        |
| %                             | RT                              | ....HEAVY NUCLEI            |
| NUCLEAR ENERGY                | RT                              | ....HYPERNUCLEI             |
| NUCLEAR WARHEADS              | ATOMEN NUCLEI                   | ....ODD-EVEN NUCLEI         |
| 2205 2806 3101 3106 3301 3302 | ATOMIC CLUSTERS                 | ....ODD-ODD NUCLEI          |
| GS                            | CONDENSATION NUCLEI             | ATOMS                       |
| WEAPONS                       | CONDENSING                      | CORPUSCULAR RADIATION       |
| .WARHEADS                     | CRYSTAL GROWTH                  | COSMIC RAYS                 |
| .#NUCLEAR WARHEADS            | CRYSTALLIZATION                 | ELEMENTARY PARTICLES        |
| NUCLEAR WASTES                | DROP SIZE                       | IONS                        |
| USE RADIOACTIVE WASTES        | %                               | ISOTOPE                     |
| NUCLEAR WEAPONS               | HEAT TREATMENT                  | NEUTRONS                    |
| 2205 2405 3401                | ICE NUCLEI                      | NUCLEAR ISOBARS             |
| GS                            | INITIATION                      | %                           |
| WEAPONS                       | INOCULATION                     | NUCLEI                      |
| #NUCLEAR WEAPONS              | JET CONDENSERS                  | NUCLEONS                    |
| ..FISSION WEAPONS             | METAL CLUSTERS                  | %                           |
| ..FUSION WEAPONS              | MOLECULAR CLUSTERS              | PHYSICS                     |
| BOMBS (ORDNANCE)              | NUCLEATE BOILING                | PROTONS                     |
| RT                            | %                               | NUCLEIC ACID DENATURATION   |
| EXPLOSIVES                    | NUCLEI                          | USE BIOPOLYMER DENATURATION |
| MISSILES                      | RECRYSTALLIZATION               | NUCLEIC ACIDS               |
| %                             | RECRYSTALLIZATION               | 0403 1808                   |
| NUCLEAR ENERGY                | SUPERCOOLING                    | GS                          |
| PROJECTILES                   |                                 | ACIDS                       |
| %                             | %                               | #NUCLEIC ACIDS              |
| ROCKETS                       | 0406 2202 2401 2405             | ..DEOXYRIBONUCLEIC ACID     |
| SPACE WEAPONS                 | SN                              | ..RIBONUCLEIC ACIDS         |
| TORPEDOES                     | (USE OF A MORE SPECIFIC TERM IS | BIOPOLYMERS                 |
| WARHEADS                      | RECOMMENDED--CONSULT THE TERMS  | #NUCLEIC ACIDS              |
| WEAPON SYSTEMS                | LISTED BELOW)                   | ..NUCLEIC ACIDS             |
| WEAPONS DELIVERY              | RT                              | ..DEOXYRIBONUCLEIC ACID     |
| NUCLEASE                      | ACTIVE GALACTIC NUCLEI          | ..RIBONUCLEIC ACIDS         |
| 0403 0406 1808                | AITKEN NUCLEI                   | ORGANIC COMPOUNDS           |
| GS                            | CHARGED PARTICLES               | #NUCLEIC ACIDS              |
| BIOPOLYMERS                   | CHROMOSOMES                     | ..DEOXYRIBONUCLEIC ACID     |
| .PROTEINS                     | CONDENSATION NUCLEI             | ..RIBONUCLEIC ACIDS         |
| ..ENZYMES                     | ICE NUCLEI                      | ..NUCLEIC ACIDS             |
| ..#NUCLEASE                   | NUCLEATION                      | ..DEOXYRIBONUCLEIC ACID     |
| ORGANIC COMPOUNDS             | NUCLEI (CYTOLOGY)               | ..RIBONUCLEIC ACIDS         |
| .PROTEINS                     | NUCLEI (NUCLEAR PHYSICS)        | BIOPOLYMER DENATURATION     |
| ..ENZYMES                     | NUCLEOGENESIS                   | GUANOSINES                  |
| ..#NUCLEASE                   | ODD-ODD NUCLEI                  | PROTEINS                    |
| NUCLEATE BOILING              | NUCLEI (CYTOLOGY)               | URIDYLIC ACID               |
| 2203 3303 3304                | 0404                            | NUCLEOGENESIS               |
| GS                            | GS                              | 0406                        |
| PHASE TRANSFORMATIONS         | ORGANELLES                      | RT                          |
| .VAPORIZING                   | #NUCLEI (CYTOLOGY)              | GENETICS                    |
| ..BOILING                     | RT                              | MUTATIONS                   |
| ..#NUCLEATE BOILING           | CYTOLOGY                        | %                           |
| ....LEIDENFROST PHENOMENON    | CYTOPLASM                       | NUCLEON POTENTIAL           |
| RT                            | GENETICS                        | 2301 2304 2403              |
| FILM BOILING                  | %                               | NUCLEI                      |



## NASA THESAURUS HIERARCHICAL UPDATE

|    |                                                                                             |  |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|---------------------------------------------------------------------------------------------|--|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | NEUTRONS<br>NUCLEAR PARTICLES<br>NUCLEAR POTENTIAL<br>% POTENTIAL<br>PROTONS<br>% RADIATION |  | GS                                    | ORGANIC COMPOUNDS<br>. CARBOHYDRATES<br>. GLUCOSIDES<br>. #NUCLEOSIDES<br>. .ADENINES<br>. .GUANOSINES<br>RT RIBOSE<br>THYMIDINE                                                                                                                                                                                                                                                                                                                                                                                     | . . . CERIUM 144<br>. . . CESIUM ISOTOPES<br>. . . CESIUM 133<br>. . . CESIUM 134<br>. . . CESIUM 137<br>. . . CESIUM 144<br>. . . CESIUM VAPOR<br>. . . CHROMIUM ISOTOPES<br>. . . COBALT ISOTOPES<br>. . . COBALT 58<br>. . . COBALT 60<br>. . . DYSPROSIUM ISOTOPES<br>. . . ERBIUM ISOTOPES<br>. . . EUROPIUM ISOTOPES<br>. . . FLUORINE ISOTOPES<br>. . . GADOLINIUM ISOTOPES<br>. . . GALLIUM ISOTOPES<br>. . . GERMANIUM ISOTOPES<br>. . . GOLD ISOTOPES<br>. . . GOLD 198<br>. . . HAFNIUM ISOTOPES<br>. . . HELIUM ISOTOPES<br>. . . HOLMIUM ISOTOPES<br>. . . HYDROGEN ISOTOPES<br>. . . DEUTERIUM<br>. . . HYDROGEN 4<br>. . . TRITIUM<br>. . . IODINE ISOTOPES<br>. . . IODINE 125<br>. . . IODINE 131<br>. . . IODINE 132<br>. . . IRIDIUM ISOTOPES<br>. . . IRON ISOTOPES<br>. . . IRON 57<br>. . . IRON 58<br>. . . IRON 59<br>. . . KRYPTON ISOTOPES<br>. . . KRYPTON 85<br>. . . LANTHANUM ISOTOPES<br>. . . LEAD ISOTOPES<br>. . . LITHIUM ISOTOPES<br>. . . LUTETIUM<br>. . . LUTETIUM ISOTOPES<br>. . . MANGANESE ISOTOPES<br>. . . MERCURY ISOTOPES<br>. . . MOLYBDENUM ISOTOPES<br>. . . NEODYMIUM ISOTOPES<br>. . . NEON ISOTOPES<br>. . . NICKEL ISOTOPES<br>. . . NIHOBIUM ISOTOPES<br>. . . NIOBIUM 95<br>. . . NITROGEN ISOTOPES<br>. . . NITROGEN 15<br>. . . NITROGEN 16<br>. . . NOBELIUM ISOTOPES |
|    |                                                                                             |  | RT                                    | RIBOSE<br>THYMIDINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                             |  | USE                                   | NUCLEOSYNTHESIS<br>NUCLEAR FUSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                             |  | NUCLEOTIDES<br>O403 1808<br>GS        | ORGANIC COMPOUNDS<br>#NUCLEOTIDES<br>. ADENINES<br>. ADENOSINES<br>. .ADENOSINE DIPHOSPHATE<br>. .ADENOSINE TRIPHOSPHATE<br>. CYCLIC AMP<br>. POLYNUCLEOTIDES<br>. PYRIDINE NUCLEOTIDES<br>. URIDYLIC ACID<br>RT BIOPOLYMERS<br>PROTEINS                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                             |  | NUCLIDES<br>2203 2403 2405 2406<br>GS | CHEMICAL ELEMENTS<br>#NUCLIDES<br>. ISOTOPES<br>. ALUMINUM ISOTOPES<br>. .ALUMINUM 26<br>. .ALUMINUM 27<br>. ANTIMONY ISOTOPES<br>. ARGON ISOTOPES<br>. ARSENIC ISOTOPES<br>. BARIUM ISOTOPES<br>. BERYLLIUM ISOTOPES<br>. .BERYLLIUM 7<br>. .BERYLLIUM 9<br>. .BERYLLIUM 10<br>. BISMUTH ISOTOPES<br>. BORON ISOTOPES<br>. .BORON 10<br>. .BROMINE ISOTOPES<br>. CADMIUM ISOTOPES<br>. CALCIUM ISOTOPES<br>. CARBON ISOTOPES<br>. .CARBON 12<br>. .CARBON 13<br>. .CARBON 14<br>. .CERIUM ISOTOPES<br>. .CERIUM 137 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                             |  | NUCLEONS<br>2403 2405<br>GS           | PARTICLES<br>. ELEMENTARY PARTICLES<br>. #NUCLEONS<br>. NUCLEAR PARTICLES<br>. #NUCLEONS<br>RT ALPHA PARTICLES<br>ANTINUCLONS<br>BARYONS<br>CHARGED PARTICLES<br>FAST NEUTRONS<br>HYPERONS<br>NEUTRONS<br>NUCLEI (NUCLEAR PHYSICS)<br>PROTONS<br>VECTOR DOMINANCE MODEL                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                             |  | NUCLEOPHILES<br>O603 1808<br>GS       | ELECTRON ATTACHMENT<br>#NUCLEOPHILES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                             |  | NUCLEOSIDES<br>O403 1808              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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...OXYGEN ISOTOPES
...OXYGEN 18
...PALLADIUM ISOTOPES
...PHOSPHORUS ISOTOPES
...PHOSPHORUS 32
...PLATINUM ISOTOPES
...POLONIUM ISOTOPES
...POLONIUM 208
...POLONIUM 209
...POLONIUM 210
...POTASSIUM ISOTOPES
...POTASSIUM 38
...POTASSIUM 39
...POTASSIUM 40
...PRASEODYMIUM ISOTOPES
...PROMETHIUM ISOTOPES
...PROTACTINIUM ISOTOPES
...RADIOACTIVE ISOTOPES
...ASTATINE ISOTOPES
...BERYLLIUM 7
...BERYLLIUM 9
...BERYLLIUM 10
...CARBON 14
...CERIUM 137
...CERIUM 144
...CESIUM 134
...CESIUM 137
...CESIUM 144
...COBALT 58
...COBALT 60
...GOLD 198
...INDIUM ISOTOPES
...IODINE 125
...IODINE 131
...IODINE 132
...IRON 59
...KRYPTON 85
...NIOBIUM 95
...NITROGEN 16
...PHOSPHORUS 32
...POLONIUM 208
...POLONIUM 209
...POLONIUM 210
...POTASSIUM 38
...POTASSIUM 40
...RUBIDIUM 86
...SODIUM 22
...SODIUM 24
...STRONTIUM 85
...STRONTIUM 88
...STRONTIUM 89
...STRONTIUM 90
...TRANSURANIUM ELEMENTS
...AMERICIUM
...AMERICIUM ISOTOPES
...AMERICIUM 241
...BERKELIUM
...CALIFORNIUM
...CALIFORNIUM ISOTOPES
...CURIUM
...CURIUM ISOTOPES
...CURIUM 242
...CURIUM 244
...EINSTEINIUM
...FERMIUM
...LAWRENCIUM
...MENDELEVIUM
...NEPTUNIUM
...NEPTUNIUM ISOTOPES
...NOBELIUM
...PLUTONIUM
...PLUTONIUM ISOTOPES
...PLUTONIUM 238
...PLUTONIUM 239
...PLUTONIUM 240
...PLUTONIUM 241
...PLUTONIUM 244
...SERGENIUM
...TRITIUM
...URANIUM 232
...URANIUM 233
...URANIUM 238
...XENON 133
...XENON 135
...ZIRCONIUM 95
...RADIUM ISOTOPES
...RADIUM 226
...RADON ISOTOPES
...RHENIUM ISOTOPES
...RHODIUM ISOTOPES
...RUBIDIUM ISOTOPES
...RUBIDIUM 86
...RUTHENIUM ISOTOPES
...SCANDIUM ISOTOPES
...SELENIUM ISOTOPES
...SILVER ISOTOPES
...SODIUM ISOTOPES
...SODIUM 22
...SODIUM 24
...STRONTIUM ISOTOPES
...STRONTIUM 85
...STRONTIUM 87
...STRONTIUM 89
...STRONTIUM 90
...TANTALUM ISOTOPES
...TELLURIUM
...TELLURIUM ISOTOPES
...TERBIUM ISOTOPES
...THORIUM ISOTOPES
...THULIUM ISOTOPES
...TIN ISOTOPES
...TITANIUM ISOTOPES
...URANIUM ISOTOPES
...URANIUM 232
...URANIUM 233
...URANIUM 234
...URANIUM 235
...URANIUM 238
...VANADIUM ISOTOPES
...XENON ISOTOPES
...XENON 129
...XENON 133
...XENON 135
...YTRIUM ISOTOPES
...ZINC ISOTOPES
...ZIRCONIUM ISOTOPES
...ZIRCONIUM 95
RT ISOTOPIC ENRICHMENT
NUCLEAR ISOBARS
PARTICLE MASS
RT
NULL HYPOTHESIS
1902 1905
GS HYPOTHESES
#NULL HYPOTHESIS
RT CONFIDENCE LIMITS
DEGREES OF FREEDOM
SIGNIFICANCE
STATISTICAL TESTS
NULL ZONES
1301 1302
GS REGIONS
#NULL ZONES
RT DIFFRACTION PATTERNS
FIELD THEORY (PHYSICS)
% FORCE
INTERFEROMETRY
RADIATION DISTRIBUTION
SPECKLE INTERFEROMETRY
VERY LONG BASE INTERFEROMETRY
NUMBER THEORY
1902
GS #NUMBER THEORY
.ADDITION THEOREM
.ARITHMETIC
..DOUBLE PRECISION ARITHMETIC
..FIXED POINT ARITHMETIC
..FLOATING POINT ARITHMETIC
..CONGRUENCES
..DIOPHANTINE EQUATION
..DIVIDING (MATHEMATICS)
..EXPONENTS
..INDUCTION (MATHEMATICS)

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# NASA THESAURUS HIERARCHICAL UPDATE

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...INTEGERS
...MULTIPLICATION
...SUBTRACTION
...ADDITION
COMBINATORIAL ANALYSIS
DECIMALS
DIGITS
% DIVISION
ENUMERATION
FIBONACCI NUMBERS
FUNCTIONS (MATHEMATICS)
% INDUCTION
INFINITY
% MATHEMATICS
% NUMBERS
QUATERNIONS
SUBGROUPS
% THEORIES
UNIQUENESS THEOREM

% NUMBERS
0703 0802 1902
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
ALPHANUMERIC CHARACTERS
BIOT NUMBER
COMPLEX NUMBERS
COUNTING
DANKOHLER NUMBER
DECIMALS
DIGITS
DIMENSIONLESS NUMBERS
DOUBLE PRECISION ARITHMETIC
FIBONACCI NUMBERS
INTEGERS
NUMBER THEORY
QUANTUM NUMBERS
RANDOM NUMBERS
REAL NUMBERS

NUMERICAL ANALYSIS
1902 1903
GS ANALYSIS (MATHEMATICS)
#NUMERICAL ANALYSIS
..APPROXIMATION
...BORN APPROXIMATION
...BORN-OPPENHEIMER APPROXIMATION
...CHEBYSHEV APPROXIMATION
...EDDINGTON APPROXIMATION
...ESSENTIALLY NON-OSCILLATORY
SCHEMES
...FINITE DIFFERENCE THEORY
...FINITE ELEMENT METHOD
...HARTREE APPROXIMATION

...LEAST SQUARES METHOD
...MEAN SQUARE VALUES
...MILNE METHOD
...MULTIGRID METHODS
...NEWTON METHODS
...NEWTON-RAPHSON METHOD
...NUMERICAL DIFFERENTIATION
...ORSEEN APPROXIMATION
...PADE APPROXIMATION
...PARTICLE IN CELL TECHNIQUE
...POHLHAUSEN METHOD
...PREDICTOR-CORRECTOR METHODS
...RAYLEIGH-RITZ METHOD
...RELAXATION METHOD (MATHEMATICS)
...RITZ AVERAGING METHOD
...SCHWARTZ METHOD
...SOMMERFELD APPROXIMATION
...TVD SCHEMES
...UPWIND SCHEMES (MATHEMATICS)
...VORTEX IN CELL TECHNIQUE
...BOUNDARY INTEGRAL METHOD
...COMPUTATIONAL CHEMISTRY
...COMPUTATIONAL FLUID DYNAMICS
...DIFFERENCE EQUATIONS
...ERROR ANALYSIS
...FINITE VOLUME METHOD
...FLUX VECTOR SPLITTING
...GLIMM METHOD
...GRAEFF CALCULUS
...INTERPOLATION
...ITERATION
...CONJUGATE GRADIENT METHOD
...ITERATIVE SOLUTION
...NEWTON METHODS
...PREDICTOR-CORRECTOR METHODS
...MONTE CARLO METHOD
...NOMOGRAPHS
...NUMERICAL INTEGRATION
...RUNGE-KUTTA METHOD
...TRUNCATION ERRORS
ADJOINTS
ALGORITHMS
ALTERNATING DIRECTION IMPLICIT
METHODS
% ANALYZING
% APPLICATIONS OF MATHEMATICS
ASYMPTOTES
COMPUTATIONAL GRIDS
COMPUTER PROGRAMMING
CRANK-NICHOLSON METHOD
DIFFERENTIAL EQUATIONS
ISOPARAMETRIC FINITE ELEMENTS
LINEAR PROGRAMMING
MATHEMATICAL TABLES
MATHEMATICS

...METHOD OF MOMENTS
...SIGNIFICANCE
...SPATIAL MARCHING
...TIME MARCHING
TRAJECTORY ANALYSIS

NUMERICAL CONTROL
0802 1504 1902 3404 4001
UF COMPUTERIZED CONTROL
GS AUTOMATIC CONTROL
#NUMERICAL CONTROL
RT % AUTOMATION
COMPUTER PROGRAMS
% CONTROL
CONTROL SYSTEMS DESIGN
DIGITAL COMMAND SYSTEMS
DIGITAL TECHNIQUES
ELECTRIC CONTROL
INTERACTIVE CONTROL
MACHINE TOOLS
PRODUCTION ENGINEERING
SEQUENTIAL CONTROL
STANDARDIZATION

NUMERICAL DATA BASES
0803
GS INFORMATION SYSTEMS
#NUMERICAL DATA BASES
RT INFORMATION RETRIEVAL
ON-LINE SYSTEMS

NUMERICAL DIFFERENTIATION
1903
GS ANALYSIS (MATHEMATICS)
..NUMERICAL ANALYSIS
...APPROXIMATION
...#NUMERICAL DIFFERENTIATION
...REAL VARIABLES
...#NUMERICAL DIFFERENTIATION
ALGORITHMS
COMPUTER TECHNIQUES
DIFFERENTIAL CALCULUS
DIFFERENTIAL EQUATIONS
ESTIMATING
FUNCTIONS (MATHEMATICS)
% THEORIES

NUMERICAL FLOW VISUALIZATION
1201 1202 1407 1903 2310 3404 3501
GS FLOW VISUALIZATION
#NUMERICAL FLOW VISUALIZATION
RT FLOW DISTRIBUTION
HYDRAULIC ANALOGIES
SCIENTIFIC VISUALIZATION

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NUMERICAL INTEGRATION  
 1902 1903 3501  
 UF COWELL METHOD  
 GS ANALYSIS (MATHEMATICS)  
 .#NUMERICAL ANALYSIS  
 .#NUMERICAL INTEGRATION  
 ...RUNGE-KUTTA METHOD  
 .REAL VARIABLES  
 .MEASURE AND INTEGRATION  
 .#NUMERICAL INTEGRATION  
 ...RUNGE-KUTTA METHOD  
 .DIFFERENTIAL EQUATIONS  
 DIGITAL INTEGRATORS  
 INTEGRAL CALCULUS  
 RT  
 NUMERICAL STABILITY  
 O101 O201  
 RT APPROXIMATION  
 BACKWARD DIFFERENCING  
 DIFFERENCE EQUATIONS  
 DIFFERENTIAL EQUATIONS  
 STRANGE ATTRACTORS  
 NUMERICAL WEATHER FORECASTING  
 1301 2001 2002 2003 2004 3107 3110  
 GS FORECASTING  
 .WEATHER FORECASTING  
 .#NUMERICAL WEATHER FORECASTING  
 METEOROLOGY  
 .WEATHER FORECASTING  
 .#NUMERICAL WEATHER FORECASTING  
 ATMOSPHERIC GENERAL CIRCULATION  
 RT MODELS  
 ATMOSPHERIC MODELS  
 AVIATION METEOROLOGY  
 COMPUTERIZED SIMULATION  
 LONG RANGE WEATHER FORECASTING  
 MATHEMATICAL MODELS  
 STATISTICAL WEATHER FORECASTING  
 NUNATAKS  
 1305 1306  
 GS LANDFORMS  
 .ISLANDS  
 .#NUNATAKS  
 RT ARCTIC REGIONS  
 ROCKS  
 SEA ICE  
 NUSSELT NUMBER  
 3303 3304 3501  
 GS RATIOS  
 .DIMENSIONLESS NUMBERS  
 .#NUSSELT NUMBER  
 RT CONVECTIVE HEAT TRANSFER  
 HEAT TRANSFER  
 PRANDTL NUMBER  
 SCHMIDT NUMBER  
 NUTATION  
 O409 1901 2403 3001  
 UF NUTATIONAL OSCILLATION  
 GS #NUTATION  
 .CHANDLER WOBBLE  
 RT ACTUATION  
 DISPLACEMENT  
 % DYNAMICS  
 EARTH ORIENTATION  
 KINEMATICS  
 LIBRATION  
 % MOTION  
 PERTURBATION  
 POLAR WANDERING (GEOLOGY)  
 PRECESSION  
 ROTATION  
 VIBRATION  
 NUTATION DAMPERS  
 1504 1901  
 RT CONTROL MOMENT GYROSCOPES  
 % DAMPERS  
 OSCILLATION DAMPERS  
 SPACECRAFT STABILITY  
 NUTATIONAL OSCILLATION  
 USE NUTATION  
 % NUTRIENTS  
 O403 O505  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT AQUICULTURE  
 CALORIC REQUIREMENTS  
 CARBOHYDRATES  
 EUTROPHICATION  
 FATS  
 FATTY ACIDS  
 FISHES  
 LIFE SUPPORT SYSTEMS  
 LIPID METABOLISM  
 LIPIDS  
 MINERALS  
 NUTRITION  
 NUTRITIONAL REQUIREMENTS  
 PROTEINS  
 TRACE ELEMENTS  
 VITAMINS  
 NUTRITION  
 O404 O405 O408 O505  
 RT BIOCHEMISTRY  
 BROTHS  
 CALORIC REQUIREMENTS  
 DIETS  
 % FOOD  
 METABOLISM  
 NITROGEN METABOLISM  
 % NUTRIENTS  
 NUTRITIONAL REQUIREMENTS  
 SPACE FLIGHT FEEDING  
 NUTRITIONAL REQUIREMENTS  
 O404 O408 O505  
 GS #NUTRITIONAL REQUIREMENTS  
 .CALORIC REQUIREMENTS  
 RT ATROPHY  
 % NUTRIENTS  
 NUTRITION  
 SPACE FLIGHT FEEDING  
 SYNTHETIC FOOD  
 NUTS (FASTENERS)  
 3404 O505 1504 1704  
 GS FASTENERS  
 #NUTS (FASTENERS)  
 RT ANCHORS (FASTENERS)  
 BOLTS  
 HOLDERS  
 SCREWS  
 THREADS  
 NUTS (FRUITS)  
 O409  
 RT ANGIOSPERMS  
 ORCHARDS  
 SEEDS  
 NYLON (TRADEMARK)  
 1504 1802 1808 1810 1812  
 GS FIBERS  
 .SYNTHETIC FIBERS  
 .#NYLON (TRADEMARK)  
 RT POLYMERIC FILMS  
 % POLYMERS  
 NYLON RESINS  
 USE POLYAMIDE RESINS  
 NYQUIST DIAGRAM  
 1902  
 GS DIAGRAMS  
 #NYQUIST DIAGRAM  
 RT CONTROL STABILITY  
 TRANSFER FUNCTIONS

[illegible]

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...ANALYTIC GEOMETRY
...SPHEROIDS
...#OBLATE SPHEROIDS
...ELLIPTICITY
FINENESS RATIO
FLATTENING
GEODESY
GEODES
PROLATE SPHEROIDS
SHAPES
SOLAR OBLATENESS

RT
OBLIQUE COORDINATES
1902
GS
COORDINATES
#OBLIQUE COORDINATES
RT CARTESIAN COORDINATES

OBLIQUE SHOCK WAVES
O101 1202 1203
GS ELASTIC WAVES
SHOCK WAVES
#OBLIQUE SHOCK WAVES
RT MAGNETOHYDRODYNAMIC WAVES
NORMAL SHOCK WAVES
SHOCK LAYERS
SUPERSONIC COMPRESSORS

OBLIQUE WINGS
O104
GS AIRFOILS
WINGS
#OBLIQUE WINGS
RT AERODYNAMIC CONFIGURATIONS
AIRCRAFT PARTS
AIRCRAFT STRUCTURES
DRONE AIRCRAFT
PILOTLESS AIRCRAFT
REMOTELY PILOTED VEHICLES
WING PLANFORMS

OBLIQUENESS
1902
RT ANGLES (GEOMETRY)
INCIDENT RADIATION

OBSCURATION
USE OCCULTATION

OBSERVABILITY (SYSTEMS)
3407
RT BOUNDARY VALUE PROBLEMS
CONTROL THEORY
DEPENDENT VARIABLES
FEEDBACK CONTROL

INDEPENDENT VARIABLES
OBSERVATION
PARAMETER IDENTIFICATION
STATE VECTORS
SYSTEM IDENTIFICATION
% SYSTEMS
SYSTEMS ANALYSIS
SYSTEMS ENGINEERING

OBSERVATION
O709 0803 1409 3405 3407
GS #OBSERVATION
.EARTH OBSERVATIONS (FROM SPACE)
..SATELLITE OBSERVATION
.SKY SURVEYS (ASTRONOMY)
.SPACED OBSERVATIONS (FROM EARTH)
.VISUAL OBSERVATION
RT COUNTING
DATA ACQUISITION
DETECTION
EVALUATION
EXAMINATION
FOREST FIRE DETECTION
OBSERVABILITY (SYSTEMS)
% PERFORMANCE
RADIO OBSERVATION
RECONNAISSANCE
SURVEILLANCE

OBSERVATION AIRCRAFT
O207
GS #OBSERVATION AIRCRAFT
.A-2 AIRCRAFT
.BREGUET 1150 AIRCRAFT
.CESSNA L-19 AIRCRAFT
.CL-84 AIRCRAFT
.E-2 AIRCRAFT
.F-5 AIRCRAFT
.G-91 AIRCRAFT
.G-95/4 AIRCRAFT
.MIRAGE AIRCRAFT
..MIRAGE 3 AIRCRAFT
.OH-4 HELICOPTER
.OH-5 HELICOPTER
.OH-6 HELICOPTER
.OV-1 AIRCRAFT
.OV-10 AIRCRAFT
.P-1127 AIRCRAFT
.P-1154 AIRCRAFT
.RB-50 AIRCRAFT
.RF-4 AIRCRAFT
.TSR-2 AIRCRAFT
.U-2 AIRCRAFT
RT % AIRCRAFT
ANTISUBMARINE WARFARE AIRCRAFT

ARC CLOUDS
BALLOONS
FLYING PLATFORMS
GLIDERS
HS-801 AIRCRAFT
KUIPER AIRBORNE OBSERVATORY
LIGHT AIRCRAFT
LIGHT HELICOPTERS
% MILITARY AIRCRAFT
RECONNAISSANCE AIRCRAFT
TERRAIN FOLLOWING AIRCRAFT
UTILITY AIRCRAFT
WEATHER RECONNAISSANCE AIRCRAFT

OBSERVATORIES
1412 3001
GS #OBSERVATORIES
.ASTRONOMICAL OBSERVATORIES
..ASTRONOMICAL SATELLITES
...ASTRONOMICAL NETHERLANDS
SATELLITE
...GAMMA RAY OBSERVATORY
...GINGA SATELLITE
...HEAO
...HEAO 1
...HEAO 2
...HEAO 3
...HUBBLE SPACE TELESCOPE
...INFRARED ASTRONOMY SATELLITE
...INFRARED SPACE OBSERVATORY (ISO)
...IUE
...LARGE DEPLOYABLE REFLECTOR
...MAGELLAN ULTRAVIOLET ASTRONOMY
SATELLITE
...DAO
...DAO 1
...DAO 2
...DAO 3
...OSO
...AOSO
...OSO-1
...OSO-2
...OSO-3
...OSO-4
...OSO-5
...OSO-6
...OSO-7
...OSO-8
...QUASAT
...SAS
...EXPLORER 53 SATELLITE
...SAS-1
...SAS-2
...SAS-3
...SPACE INFRARED TELESCOPE

```

|                                |                           |                                 |
|--------------------------------|---------------------------|---------------------------------|
| FACILITY                       | SILICON DIOXIDE           | WORK                            |
| ...SPARTAN SATELLITES          | SOILS                     |                                 |
| ...TENMA SATELLITE             |                           | OCCUPATIONAL DISEASES           |
| ...X RAY ASTROPHYSICS FACILITY |                           | O404 O405 O408 O410 O412        |
| ..ASTROPLANE                   | OBSDIAN GLASS             | GS DISEASES                     |
| ..ROSAT MISSION                | 1805 1806                 | #OCCUPATIONAL DISEASES          |
| ..SOFIA (AIRBORNE OBSERVATORY) | GS GLASS                  | RT ANEMIAS                      |
| .GEOPHYSICAL OBSERVATORIES     | #OBSDIAN GLASS            | CARBON MONOXIDE POISONING       |
| ..OGO                          | OBSTACLE AVOIDANCE        | CATARACTS                       |
| ...EGO                         | O702                      | EMPHYSEMA                       |
| ...OGO-A                       | RT AIRCRAFT MANEUVERS     | HAZARDS                         |
| ...OGO-3                       | EVASIVE ACTIONS           | HEALTH PHYSICS                  |
| ...OGO-5                       | TACTICS                   | LEAD POISONING                  |
| ...POGO                        | VULNERABILITY             | LEUKEMIAS                       |
| ...OGO-C                       |                           | OPERATIONAL HAZARDS             |
| ...OGO-4                       | OBSTACLES                 | PUBLIC HEALTH                   |
| ...OGO-6                       | USE BARRIERS              | PULMONARY LESIONS               |
| ...OSO                         |                           | RADIATION HAZARDS               |
| ...OSO-C                       | USE BARRIERS              | TOXIC HAZARDS                   |
| ...OSO-1                       | OBSTRUCTING               | TUMORS                          |
| ...OSO-2                       | USE BLOCKING              |                                 |
| ...OSO-3                       |                           | OCCURRENCES                     |
| ...OSO-4                       | OCCIPITAL LOBES           | 2311 3407                       |
| ...OSO-5                       | O401 O404 O405            | RT EVENTS                       |
| ...OSO-6                       | GS ANATOMY                |                                 |
| ...OSO-7                       | .NERVOUS SYSTEM           | OCEAN BOTTOM                    |
| ...OSO-8                       | ..CENTRAL NERVOUS SYSTEM  | 1306 1308 1310                  |
| .JODRELL BANK OBSERVATORY      | ...BRAIN                  | BEDS (GEOLOGY)                  |
| .KUIPER AIRBORNE OBSERVATORY   | ....CEREBRUM              | RT CONTINENTAL SHELVES          |
| .LUNAR OBSERVATORIES           | .....#OCCIPITAL LOBES     | CORE SAMPLING                   |
| .SOLAR OBSERVATORIES           |                           | CRATONS                         |
| ..OSO                          | OCCCLUSION                | DEEP WATER                      |
| ...AOSO                        | O405 O602 1203 3501       | GEOLOGY                         |
| ...OSO-C                       | RT DEGASSING              | MARINE CHEMISTRY                |
| ...OSO-1                       | GAS-METAL INTERACTIONS    | MID-OCEAN RIDGES                |
| ...OSO-2                       | GAS-SOLID INTERFACES      | MUD                             |
| ...OSO-3                       | SOLIDIFICATION            | OCEANOGRAPHY                    |
| ...OSO-4                       |                           | SEA FLOOR SPREADING             |
| ...OSO-5                       | OCCULTATION               | SEAMOUNTS                       |
| ...OSO-6                       | UF OBSCURATION            | SEDIMENTS                       |
| ...OSO-7                       | GS #OCCULTATION           | SLUDGE                          |
| ...OSO-8                       | .LUNAR OCCULTATION        | UNDERWATER RESOURCES            |
| ..PINHOLE OCCULTER FACILITY    | ..SOLAR ECLIPSES          |                                 |
| RT ARTIFICIAL SATELLITES       | ..RADIO OCCULTATION       | OCEAN COLOR SCANNER             |
|                                | .STELLAR OCCULTATION      | 1409                            |
|                                | RT % CONJUNCTION          | GS SCANNERS                     |
|                                | ECLIPSES                  | #OCEAN COLOR SCANNER            |
|                                | EXTINGUISHING             | RT CHLOROPHYLLS                 |
|                                | PINHOLE OCCULTER FACILITY | COASTAL WATER                   |
|                                | % TRANSIT                 | COASTAL ZONE COLOR SCANNER      |
|                                |                           | COLORIMETRY                     |
|                                | OCCUPATION                | MULTISPECTRAL BAND SCANNERS     |
|                                | 3402                      | OCEAN DATA ACQUISITIONS SYSTEMS |
|                                | RT INDUSTRIAL SAFETY      | OCEANOGRAPHIC PARAMETERS        |
|                                | PERSONNEL                 | OCEANOGRAPHY                    |
| OBSDIAN                        |                           |                                 |
| 1805 1806                      |                           |                                 |
| GS ROCKS                       |                           |                                 |
| .IGNEOUS ROCKS                 |                           |                                 |
| ..#OBSDIAN                     |                           |                                 |
| ...MOLDAVITE                   |                           |                                 |
| RT GLASS                       |                           |                                 |
| MINERALS                       |                           |                                 |
| POWDER (PARTICLES)             |                           |                                 |
| PUMICE                         |                           |                                 |

PHOTOMAPPING  
 REMOTE SENSORS  
 WATER COLOR

OCEAN CURRENTS  
 1310 2003  
 GS CIRCULATION  
 . WATER CIRCULATION  
 .. WATER CURRENTS  
 ... #OCEAN CURRENTS  
 .... COASTAL CURRENTS  
 ..... EL NINO  
 ..... GULF STREAM  
 ..... LOMONOSOV CURRENT  
 .... CORE SAMPLING  
 RT % CURRENTS  
 FLUID FLOW  
 FRONTAL WAVES  
 GYRES  
 HYDROGRAPHY  
 LITTORAL DRIFT  
 LITTORAL TRANSPORT  
 OCEAN DYNAMICS  
 OCEANOGRAPHY  
 OCEANS  
 PRESSURE ICE  
 SALINITY  
 SPITSBERGEN (NORWAY)  
 TIDAL WAVES  
 TIDE POWERED GENERATORS  
 TIDE POWERED MACHINES  
 TIDEPPOWER  
 TIDES  
 TOPEX  
 UPWELLING WATER  
 WATERWAVE ENERGY CONVERSION  
 WATERWAVE POWERED MACHINES

OCEAN DATA ACQUISITIONS SYSTEMS  
 0803 1310 2003  
 UF OCEAN DATA PLATFORMS  
 OCEAN DATA STATIONS  
 ODAS  
 RT ARGOS SYSTEM  
 AUTOMATIC WEATHER STATIONS  
 BUOYS  
 COASTAL ZONE COLOR SCANNER  
 % DATA  
 DATA ACQUISITION  
 GROUND STATIONS  
 INSTRUMENT PACKAGES  
 METEOROLOGICAL PARAMETERS  
 OCEAN COLOR SCANNER  
 OCEANOGRAPHIC PARAMETERS  
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 UNDERWATER RESEARCH LABORATORIES  
 WEATHER STATIONS

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 USE OCEAN DATA ACQUISITIONS SYSTEMS

OCEAN DATA STATIONS  
 USE OCEAN DATA ACQUISITIONS SYSTEMS

OCEAN DYNAMICS  
 1310  
 RT AIR WATER INTERACTIONS  
 DYNAMIC CHARACTERISTICS  
 % DYNAMICS  
 FLUID DYNAMICS  
 HYDRODYNAMICS  
 OCEAN CURRENTS  
 OCEAN MODELS  
 OCEAN SURFACE  
 OCEANOGRAPHY  
 WATER WAVES

OCEAN FLOOR SPREADING  
 USE SEA FLOOR SPREADING

OCEAN MODELS  
 1310 1902  
 GS MODELS  
 #OCEAN MODELS  
 RT AIR WATER INTERACTIONS  
 ATMOSPHERIC MODELS  
 DYNAMIC MODELS  
 MARINE ENVIRONMENTS  
 MATHEMATICAL MODELS  
 OCEAN DYNAMICS  
 OCEANOGRAPHY  
 SARGASSO SEA  
 SEA ROUGHNESS  
 SEA STATES

OCEAN SURFACE  
 1304 1306 1310  
 RT EARTH SURFACE  
 FLUID FLOW  
 HYDROGRAPHY  
 OCEAN DYNAMICS  
 OCEANOGRAPHIC PARAMETERS  
 OCEANOGRAPHY  
 SARGASSO SEA  
 SEA LEVEL  
 SEA ROUGHNESS  
 SEA STATES  
 SEA SURFACE TEMPERATURE  
 SEA TRUTH

SEA WATER  
 STORM SURGES  
 % SURFACES  
 TIDAL WAVES  
 TIDE POWERED GENERATORS  
 TIDE POWERED MACHINES  
 TIDEPPOWER  
 TIDES  
 TOPEX  
 WATERWAVE ENERGY CONVERSION  
 WATERWAVE POWERED MACHINES

OCEAN TEMPERATURE  
 1310  
 GS OCEANOGRAPHIC PARAMETERS  
 #OCEAN TEMPERATURE  
 .. SEA SURFACE TEMPERATURE  
 TEMPERATURE  
 . WATER TEMPERATURE  
 . #OCEAN TEMPERATURE  
 ... SEA SURFACE TEMPERATURE  
 EL NINO  
 OCEANOGRAPHY  
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 SEA STATES  
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 TEMPERATURE DISTRIBUTION  
 TEMPERATURE GRADIENTS  
 THERMAL POLLUTION

OCEAN THERMAL ENERGY CONVERSION  
 1306  
 GS ENERGY CONVERSION  
 #OCEAN THERMAL ENERGY CONVERSION  
 RT % CONVERSION  
 % ENERGY SOURCES  
 GEOTHERMAL ENERGY CONVERSION  
 GEOTHERMAL TECHNOLOGY  
 SOLAR SEA POWER PLANTS  
 TEMPERATURE

OCEANOGRAPHIC PARAMETERS  
 1310 2003  
 GS #OCEANOGRAPHIC PARAMETERS  
 . OCEAN TEMPERATURE  
 . SEA SURFACE TEMPERATURE  
 RT ATMOSPHERIC & OCEANOGRAPHIC INFORM  
 SYS  
 COASTAL ZONE COLOR SCANNER  
 INTEGRATED GLOBAL OCEAN STATION



# NASA THESAURUS HIERARCHICAL UPDATE

SYSTEMS  
 METEOROLOGICAL PARAMETERS  
 OCEAN COLOR SCANNER  
 OCEAN DATA ACQUISITIONS SYSTEMS  
 OCEAN SURFACE  
 SALINITY  
 SEA STATES

OCEANOGRAPHY  
 1310 2003  
 RT ARTIFICIAL HARBORS  
 ATMOSPHERIC & OCEANOGRAPHIC INFORM  
 SYS  
 BATHYMETERS  
 BAY ICE  
 BREAKWATERS  
 COASTAL CURRENTS  
 COASTAL ZONE COLOR SCANNER  
 CORE SAMPLING  
 DEEP SCATTERING LAYERS  
 DEEP WATER  
 DEEPWATER TERMINALS  
 EARTH & OCEAN PHYSICS APPLICATIONS  
 PROGRAM  
 EARTH PLANETARY STRUCTURE  
 EARTH RESOURCES  
 EARTH SCIENCES  
 ENVIRONMENTAL MONITORING  
 EROS (SATELLITES)  
 ESTUARIES  
 FIORDS  
 FRONTAL WAVES  
 GARP ATLANTIC TROPICAL EXPERIMENT  
 GEOGRAPHY  
 GEOLOGY  
 GEOPHYSICS  
 GYRES  
 HARBORS  
 HYDROCLIMATOLOGY  
 HYDROGRAPHY  
 HYDROLOGY  
 ICE FLOES  
 ICE MAPPING  
 ISTHMUSES  
 LANDSAT SATELLITES  
 MARINE BIOLOGY  
 MARINE ENVIRONMENTS  
 MARINE METEOROLOGY  
 MARINE RESOURCES  
 MARINE TECHNOLOGY  
 MARSHLANDS  
 METEOROLOGY  
 MID-OCEAN RIDGES  
 OCEAN BOTTOM  
 OCEAN COLOR SCANNER

OCEAN CURRENTS  
 OCEAN DYNAMICS  
 OCEAN MODELS  
 OCEAN SURFACE  
 OCEAN TEMPERATURE  
 OCEANS  
 OFFSHORE DOCKING  
 OFFSHORE PLATFORMS  
 OIL SLICKS  
 PELAGIC ZONE  
 PHYSICAL SCIENCES  
 RED TIDE  
 REEFS  
 SARGASSO SEA  
 SCIENCE  
 SEA GRASSES  
 SEA ICE  
 SEA LEVEL  
 SEA ROUGHNESS  
 SEA STATES  
 SEA SURFACE TEMPERATURE  
 SEA WATER  
 SEAS  
 SEASAT PROGRAM  
 SEASAT SATELLITES  
 SEASAT 1  
 SEASAT-B SATELLITE  
 SEAWEEDES  
 SHALLOW WATER  
 SHIPYARDS  
 SHOALS  
 SHORELINES  
 STORM SURGES  
 TANKER TERMINALS  
 THERMOCLINES  
 TIDAL WAVES  
 TIDEPOWER  
 TIDE POWERED GENERATORS  
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 WATERWAVE ENERGY  
 WATERWAVE ENERGY CONVERSION  
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OCEANS  
 1305 1310  
 GS #OCEANS  
 .ANTARCTIC OCEAN  
 .ARCTIC OCEAN

RT  
 .ATLANTIC OCEAN  
 .INDIAN OCEAN  
 .PACIFIC OCEAN  
 COASTAL CURRENTS  
 COASTAL WATER  
 COASTS  
 DEEP WATER  
 EARTH HYDROSPHERE  
 GEOGRAPHY  
 KEYS (ISLANDS)  
 MARINE RESOURCES  
 NEARSHORE WATER  
 OCEAN CURRENTS  
 OCEAN TEMPERATURE  
 OCEANOGRAPHY  
 SEAS  
 SEAWEEDES  
 SHALLOW WATER  
 SHOALS  
 SHORELINES  
 SOUNDS (TOPOGRAPHIC FEATURES)  
 THERMAL POLLUTION  
 TIDAL FLATS  
 TIDE POWERED GENERATORS  
 WATER COLOR  
 WATER DEPTH  
 WATER RESOURCES  
 WATERWAVE ENERGY CONVERSION

OCTAHEDRAL RESEARCH SATELLITES  
 USE ENVIRONMENTAL RESEARCH SATELLITES

OCTAHEDRITE  
 USE ANATASE

OCTAHEDRONS  
 1902  
 GS GEOMETRY  
 .EUCLIDEAN GEOMETRY  
 ..POLYHEDRONS  
 ...#OCTAHEDRONS

% OCTANE  
 1808 2701 3301  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ANTIKNOCK ADDITIVES  
 OCTANES

OCTANE NUMBER  
 1808 2701 3301  
 RT GASOLINE

OCTANES

```

0603      (ACYCLIC HYDROCARBONS)
SN      ORGANIC COMPOUNDS
GS      .HYDROCARBONS
      ..ALIPHATIC HYDROCARBONS
      ...ALKANES
      ...#OCTANES
RT      ANTIKNOCK ADDITIVES
      % OCTANE

OCTAVES
0705    2301 2402
GS      RANGE (EXTREMES)
      .FREQUENCY RANGES
      .#OCTAVES
RT      ACOUSTICS
      MUSIC

OCTETS
2401    2405
GS      VALENCE
      #OCTETS
RT      ATOMIC STRUCTURE
      CHEMICAL BONDS

OCTOATES
1808
GS      ESTERS
      #OCTOATES

OCTOL (EXPLOSIVE)
3302
GS      EXPLOSIVES
      #OCTOL (EXPLOSIVE)

OCTOPUSES
0402
GS      ANIMALS
      .INVERTEBRATES
      ..MOLLUSKS
      ...CEPHALOPODS
      ...#OCTOPUSES

OCULAR CIRCULATION
0404 0408
GS      CIRCULATION
      .BLOOD CIRCULATION
      .#OCULAR CIRCULATION

OCULOGRAVIC ILLUSIONS
0401 0408 1309
GS      PSYCHOLOGICAL EFFECTS
      .ILLUSIONS
      .#OCULOGRAVIC ILLUSIONS
RT      GRAVIRECEPTORS

OTOLITH ORGANS
VERTICAL PERCEPTION

OCULOMETERS
0501 1406
GS      MEASURING INSTRUMENTS
      .OPTICAL MEASURING INSTRUMENTS
      .#OCULOMETERS
      .OPTICAL EQUIPMENT
      .OPTICAL MEASURING INSTRUMENTS
      .#OCULOMETERS
RT      EYE MOVEMENTS
      % INSTRUMENTS
      OPTICAL TRACKING

OCULOMOTOR NERVES
0403 0404
GS      ANATOMY
      .NERVOUS SYSTEM
      ..NERVES
      ..#OCULOMOTOR NERVES
      .SENSE ORGANS
      ..EYE (ANATOMY)
      ..#OCULOMOTOR NERVES
RT      VISION

ODAS
USE      OCEAN DATA ACQUISITIONS SYSTEMS

ODD-EVEN NUCLEI
2401 2405
GS      PARTICLES
      .CHARGED PARTICLES
      ..ENERGETIC PARTICLES
      ...NUCLEI (NUCLEAR PHYSICS)
      ...#ODD-EVEN NUCLEI
      EVEN-EVEN NUCLEI
RT      ODD-ODD NUCLEI

ODD-ODD NUCLEI
2401 2405
GS      PARTICLES
      .CHARGED PARTICLES
      ..ENERGETIC PARTICLES
      ...NUCLEI (NUCLEAR PHYSICS)
      ...#ODD-ODD NUCLEI
      EVEN-EVEN NUCLEI
RT      NUCLEAR STRUCTURE
      % NUCLEI
      ODD-EVEN NUCLEI

ODESSA METEORITE
3005
GS      CELESTIAL BODIES
      .METEORITES

ODORS
0408
RT      AIR POLLUTION
      COMBUSTION PRODUCTS
      EXHAUST GASES
      GASES

OFF-ON CONTROL
1002 1003 4001
UF      BANG-BANG CONTROL
GS      AUTOMATIC CONTROL
      #OFF-ON CONTROL
RT      CONTROL
      CONTROL EQUIPMENT
      CONTROL THEORY
      PROPORTIONAL CONTROL
      SERVOCONTROL
      SOLENOID VALVES

OFFGASSING
0905
RT      DEGASSING
      VACUUM
      VACUUM EFFECTS

OFFICE AUTOMATION
2308
RT      AUTOMATION
      MAN MACHINE SYSTEMS
      WORD PROCESSING

OFFICE OF SPACE & TERRESTRIAL APPLICATIONS PAYLOADS
USE      OSTA-1 PAYLOAD
      OSTA-2 PAYLOAD
      OSTA-3 PAYLOAD

OFFSHORE DOCKING
1102 1305 1310 3404
RT      ARTIFICIAL HARBORS
      CARGO SHIPS
      DEEPWATER TERMINALS
      MARINE TECHNOLOGY
      MARINE TRANSPORTATION
      OCEANOGRAPHY
      SHIP TERMINALS
      TANKER SHIPS
      TANKER TERMINALS
      % TANKERS
      TERMINAL FACILITIES
      TRANSPORTATION

OFFSHORE ENERGY SOURCES

```

[illegible]

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

## OHMMETERS

O905 1406 2304  
GS MEASURING INSTRUMENTS  
#OHMMETERS  
RT ELECTRICAL CONDUCTIVITY METERS  
ELECTRICAL IMPEDANCE  
ELECTRICAL MEASUREMENT  
ELECTRICAL RESISTANCE  
RESISTANCE THERMOMETERS  
TRANSCONDUCTANCE  
WHEATSTONE BRIDGES

## OHMS LAW

1001 2302 2304 3408  
GS CIRCUITS  
#OHMS LAW  
LAWS  
#OHMS LAW

RT % CONDUCTIVITY  
ELECTRIC CURRENT  
ELECTRICAL RESISTANCE  
ELECTRICITY  
ELECTROMOTIVE FORCES  
TRANSCONDUCTANCE  
VOLT-AMPERE CHARACTERISTICS

## OHZORA SATELLITE

USE EXOS-C SATELLITE

## OIL ADDITIVES

O603 1808  
GS ADDITIVES  
#OIL ADDITIVES

## OIL EXPLORATION

1306 1308  
GS EXPLORATION  
#OIL EXPLORATION  
RT CRUDE OIL  
DRILLING  
ENERGY POLICY  
GEOLOGY  
NATURAL GAS EXPLORATION  
OFFSHORE ENERGY SOURCES  
TAR SANDS  
UNDERWATER RESOURCES

## OIL FIELDS

1305 1306 1308  
GS RESOURCES  
.EARTH RESOURCES  
#OIL FIELDS  
RT CRUDE OIL  
DRILLING  
METHANE

NATURAL GAS  
OFFSHORE ENERGY SOURCES  
OILS  
TAR SANDS

## OIL POLLUTION

O411 O504  
GS POLLUTION  
.ENVIRONMENT POLLUTION  
..WATER POLLUTION  
..#OIL POLLUTION  
RT COASTAL ECOLOGY  
WETLANDS

## OIL RECOVERY

1503 1504  
RT ENERGY TECHNOLOGY  
RECLAMATION  
% RECOVERY  
REUSE

## OIL SLICKS

1503  
UF SLICKS  
RT DUMPING  
ENVIRONMENT POLLUTION  
OCEANOGRAPHY  
POLLUTION  
SPILLING  
WATER POLLUTION

## OILS

O403 1503 1803 1805 1806 1808  
GS #OILS  
.CASTOR OIL  
.CRUDE OIL  
.FUEL OILS  
.LUBRICATING OILS  
.MINERAL OILS  
.SHALE OIL  
RT ENERGY POLICY  
FATS  
FUELS  
GREASES  
HYDRAULIC FLUIDS  
KEROGEN  
LIPID METABOLISM  
LUBRICANTS  
OIL FIELDS  
PETROLEUM PRODUCTS  
PITCH (MATERIAL)  
RETORT PROCESSING  
TAR SANDS

## RT

1901 3001  
GS CELESTIAL BODIES  
.COMETS  
.#OKAZAKI-LEVY-RUDENKO COMET

## OKHANSK METEORITE

3005  
GS CELESTIAL BODIES  
.METEORITES  
..STONY METEORITES  
...CHONDRITES  
...#OKHANSK METEORITE  
RT IRON METEORITES

## OKLAHOMA

1305  
GS NATIONS  
.UNITED STATES  
.#OKLAHOMA  
RT LAKE TEXOMA (OK-TX)

## OLEFINS

USE ALKENES

## OLEIC ACID

1808  
GS ACIDS  
.CARBOXYLIC ACIDS  
..FATTY ACIDS  
..#OLEIC ACID  
ORGANIC COMPOUNDS  
.CARBOXYLIC ACIDS  
..FATTY ACIDS  
..#OLEIC ACID

## OLFACTORY PERCEPTION

O404 O408  
UF SMELL  
GS PERCEPTION  
.SENSORY PERCEPTION  
.#OLFACTORY PERCEPTION  
RT CHEMORECEPTORS  
SENSE ORGANS

## OLIGOMERS

RT MONOMERS  
POLYMER CHEMISTRY  
POLYMERIZATION  
% POLYMERS

## OLIVINE

1806  
GS MINERALS  
#OLIVINE  
..FORSTERITE

## OKAZAKI-LEVY-RUDENKO COMET

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                            |                                                                                     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                                                                                                                         | DUNITE<br>IGNEOUS ROCKS<br>MONTICELLITE<br>PERIDOTITE<br>REGOLITH<br>ROCKS<br>SOILS |    | . STARS<br>. . . GIANT STARS<br>. . . #OMICRON CETI STAR<br>. . . LATE STARS<br>. . . COOL STARS<br>. . . MIRA VARIABLES<br>. . . #OMICRON CETI STAR<br>. . . VARIABLE STARS<br>. . . MIRA VARIABLES<br>. . . #OMICRON CETI STAR                                                                                                                                                                                                                                                                                                      | ON-STAR PROGRAMMING<br>O802<br>GS COMPUTER PROGRAMMING<br>#ON-LINE PROGRAMMING                                                                                                                                                                                                                                                                                                                                                      |
| OMAN                                                                                                                                                                                                                                                       | 1301<br>GS NATIONS<br>#OMAN                                                         |    | OMNIDIRECTIONAL ANTENNAS<br>O701 O705 O901<br>GS ANTENNAS<br>#OMNIDIRECTIONAL ANTENNAS<br>. . MONOPOLE ANTENNAS<br>. . WHIP ANTENNAS<br>. . TURNSTILE ANTENNAS<br>DIPLOLE ANTENNAS<br>DIRECTIONAL ANTENNAS<br>MICROWAVE ANTENNAS<br>RADIO ANTENNAS                                                                                                                                                                                                                                                                                    | ON-LINE SYSTEMS<br>O801<br>RT COMPUTER PROGRAMS<br>COMPUTER TECHNIQUES<br>DATA MANAGEMENT<br>DATA PROCESSING<br>INFORMATION RETRIEVAL<br>INFORMATION SYSTEMS<br>INTEGRATED LIBRARY SYSTEMS<br>NUMERICAL DATA BASES<br>% SYSTEMS                                                                                                                                                                                                     |
| OMCVD                                                                                                                                                                                                                                                      | (VAPOR DEPOSITION)<br>USE METALORGANIC CHEMICAL VAPOR<br>DEPOSITION                 |    | OMNIDIRECTIONAL RADIO RANGES<br>O702 O703 2402<br>GS NAVIGATION AIDS<br>. BEACONS<br>. . RADIO BEACONS<br>. . #OMNIDIRECTIONAL RADIO RANGES<br>. . . SELF CALIBRATING OMNIRANGE<br>RADIO EQUIPMENT<br>. RADIO TRANSMITTERS<br>. . RADIO BEACONS<br>. . #OMNIDIRECTIONAL RADIO RANGES<br>. . . SELF CALIBRATING OMNIRANGE<br>TRANSMITTERS<br>. RADIO TRANSMITTERS<br>. . RADIO BEACONS<br>. . #OMNIDIRECTIONAL RADIO RANGES<br>. . . SELF CALIBRATING OMNIRANGE<br>DISTANCE MEASURING EQUIPMENT<br>RADIO NAVIGATION<br>SOLAR COMPASSES | ONBOARD COMPUTERS<br>USE AIRBORNE/SPACEBORNE COMPUTERS<br><br>ONBOARD DATA PROCESSING<br>O802<br>GS DATA PROCESSING<br>#ONBOARD DATA PROCESSING<br>AIRBORNE/SPACEBORNE COMPUTERS<br>RT % DATA<br>FLIGHT MANAGEMENT SYSTEMS<br>IMAGE PROCESSING<br>MICROPROCESSORS<br>REAL TIME OPERATION<br>SIGNAL PROCESSING                                                                                                                       |
| OME                                                                                                                                                                                                                                                        | ORBIT MANEUVERING ENGINE (SPACE<br>SHUTTLE)                                         | RT | OMNIPOL HC-3 HELICOPTER<br>USE HC-3 HELICOPTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ONBOARD EQUIPMENT<br>O202 O301 O507 O701 O801 O904 2104<br>GS #ONBOARD EQUIPMENT<br>. AIRBORNE EQUIPMENT<br>. . AIRBORNE/SPACEBORNE COMPUTERS<br>. . LIGHT AIRBORNE MULTIPURPOSE<br>SYSTEM<br>. TERCOM<br>. AIRBORNE LASERS<br>. AIRCRAFT EQUIPMENT<br>. BOMBING EQUIPMENT<br>. EJECTION SEATS<br>. FLYING EJECTION SEATS<br>. TERCOM<br>. SPACECRAFT EQUIPMENT<br>. SPACECRAFT ELECTRONIC EQUIPMENT<br>AIRBORNE SURVEILLANCE RADAR |
| OMEGA NAVIGATION SYSTEM                                                                                                                                                                                                                                    |                                                                                     |    | OMNIPOL Z-37 AIRCRAFT<br>USE Z-37 AIRCRAFT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | % AIRCRAFT<br>BUBBLE TECHNIQUE<br>CREW PROCEDURES (PREFLIGHT)<br>% EQUIPMENT<br>FLIGHT INSTRUMENTS                                                                                                                                                                                                                                                                                                                                  |
| 2103<br>GS MEASURING INSTRUMENTS<br>#OMEGA NAVIGATION SYSTEM<br>NAVIGATION<br>#OMEGA NAVIGATION SYSTEM                                                                                                                                                     |                                                                                     |    | OMNIRANGE NAVIGATION<br>USE VHF OMNIRANGE NAVIGATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| RT % SYSTEMS                                                                                                                                                                                                                                               | AIR NAVIGATION                                                                      |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| OMEGA-MESONS<br>2403 2405<br>GS PARTICLES<br>. ELEMENTARY PARTICLES<br>. . FERMIONS<br>. . . BARYONS<br>. . . #OMEGA-MESONS<br>. . HADRONS<br>. . . BARYONS<br>. . . #OMEGA-MESONS<br>. . MESONS<br>. . . #OMEGA-MESONS<br>CHARGED PARTICLES<br>ETA-MESONS |                                                                                     | RT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| OMEGATRONS                                                                                                                                                                                                                                                 |                                                                                     |    | OMNIPOL Z-37 AIRCRAFT<br>USE Z-37 AIRCRAFT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2202 2401 2403<br>GS PARTICLE ACCELERATORS<br>. CYCLOTRONS<br>. #OMEGATRONS                                                                                                                                                                                |                                                                                     |    | OMNIRANGE NAVIGATION<br>USE VHF OMNIRANGE NAVIGATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| OMICRON CETI STAR<br>3001<br>UF MIRA CETI STAR<br>GS CELESTIAL BODIES                                                                                                                                                                                      |                                                                                     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                     |

FLIGHT OPERATIONS  
FLIGHT SAFETY  
HEATING EQUIPMENT  
LIFE SUPPORT SYSTEMS  
LIGHTING EQUIPMENT  
RADAR EQUIPMENT  
RADIO EQUIPMENT  
SPACECRAFT INSTRUMENTS  
STORAGE (ONBOARD EQUIPMENT)  
SURVIVAL EQUIPMENT  
TELECOMMUNICATION  
% TEST EQUIPMENT  
TRAINING DEVICES

ONE-PHASE FLOW  
USE SINGLE-PHASE FLOW

ONISOTROPY  
USE ANISOTROPY

ONSAGER PHENOMENOLOGICAL COEFFICIENT  
1202 1902 2304 2311 3304  
GS COEFFICIENTS  
#ONSAGER PHENOMENOLOGICAL  
COEFFICIENT  
RT FLUX DENSITY  
PLASMAS (PHYSICS)  
STATISTICAL MECHANICS  
VARIATIONAL PRINCIPLES

ONSAGER RELATIONSHIP  
 O603 2404 3304  
 RT % EQUILIBRIUM  
 IRREVERSIBLE PROCESSES  
 THERMODYNAMICS

ONTARIO  
1305  
GS  
NATIONS  
. CANADA  
. #ONTARI

## ONTOGENESIS

USE ONTOGENY  
ONTOGENY  
O404 1902  
UF ONTOGENESIS  
RT BIOGENY  
EVOLUTION (DEVELOPMENT)  
GROWTH  
NEUROPHYSIOLOGY

OOCTES  
USE GAMETOCYTES

OORT CLOUD  
 1901 3001  
 RT % CLOUDS  
 COMET NUCLEI  
 COMETS  
 NEMESIS (STAR)  
 SOLAR SYSTEM

| OPACIFIERS  | 2306 | 2310 | 2402 | 2502 |
|-------------|------|------|------|------|
| GS          |      |      |      |      |
| ADDITIVES   |      |      |      |      |
| #OPACIFIERS |      |      |      |      |
| RT % AGENTS |      |      |      |      |
| FILLERS     |      |      |      |      |

OPACITY 2306 2310 2402 3408  
 GS ELECTROMAGNETIC PROPERTIES  
 . OPTICAL PROPERTIES  
 . #OPACITY  
 RT ABSORPTANCE  
 ABSORPTIVITY  
 ACOUSTICS  
 ATMOSPHERIC OPTICS  
 ATTENUATION COEFFICIENTS  
 CLARITY  
 DENSITY (MASS/VOLUME)  
 ELECTROMAGNETIC ABSORPTION  
 HAZE  
 KRAMERS-KRONIG FORMULA  
 LIGHT (VISIBLE RADIATION)  
 LIGHT TRANSMISSION

TRANSMISSION EFFICIENCY  
TRANSMISSION  
TRANSMISSIVITY  
TRANSPARENCY  
TURBIDITY  
UNDERWATER OPTICS  
VISIBILITY

## OPALESCENCE

2306 2310 3408  
RT IRIDESCENCE  
OPTICAL PROPERTIES

```

OPEN CHANNEL FLOW
1202 1204
GS
  FLUID FLOW
    .CHANNEL FLOW
    .#OPEN CHANNEL FLOW
    .LIQUID FLOW
    .#OPEN CHANNEL FLOW
RT
  CAVITY FLOW
  LAMINAR FLOW
  MEANDERS
  PIPE FLOW
  TURBULENT FLOW
  WATER FLOW

```

OPEN CIRCUIT VOLTAGE

```

1002
GS      POTENTIAL ENERGY
        .ELECTRIC POTENTIAL
        .#OPEN CIRCUIT VOLTAGE
RT      BIAS

```

CAPACITANCE  
ELECTRICAL PROPERTIES  
ELECTRICAL RESISTIVITY  
ELECTROMOTIVE FORCES  
ENERGY CONVERSION EFFICIENCY  
OVERVOLTAGE  
% POTENTIAL  
POWER GAIN  
SHORT CIRCUIT CURRENTS  
SOLAR CELLS  
STATIC ELECTRICITY  
VOLT-AMPERE CHARACTERISTICS

```
OPEN CLUSTERS
3001 3003
GS CELESTIAL BODIES
.STAR CLUSTERS
.OPEN CLUSTERS
...PLEIADES CLUS
...PRAESEPE STAR
```

```

OPEN PROJECT
2501 3009
UF      ORIGIN OF PLASMAS IN EARTH
        NEIGHBORHOOD
        PROGRAMS
GS      . NESA PROGRAMS
        . . NESA SPACE PROGRAMS
        . . #OPEN PROJECT
        . PROJECTS
        . #OPEN PROJECT

```

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                                                     | . SPACE PROGRAMS<br>. . NASA SPACE PROGRAMS<br>.. #OPEN PROJECT<br>EARTH ATMOSPHERE<br>EARTH MAGNETOSPHERE<br>PLASMA DIAGNOSTICS<br>PLASMA PHYSICS<br>PLASMASPHERE<br>SATELLITE-BORNE INSTRUMENTS<br>SPACE PLASMAS                                                                                                                                                                                                                                                                                                                |  | OPERATING SYSTEMS (COMPUTERS)<br>O802<br>UF EXECUTIVE SYSTEMS (COMPUTERS)<br>GS COMPUTER PROGRAMS<br>. COMPUTER SYSTEMS PROGRAMS<br>. #OPERATING SYSTEMS (COMPUTERS)<br>...DISK OPERATING SYSTEM (DOS)<br>...UNIX (OPERATING SYSTEM)<br>ASSEMBLER ROUTINES<br>COMPILERS<br>COMPUTER INFORMATION SECURITY<br>COMPUTER SYSTEMS DESIGN<br>INPUT/OUTPUT ROUTINES<br>MIMD (COMPUTERS)<br>% ROUTINES<br>% SIMD (COMPUTERS)<br>% SYSTEMS<br>WINDOWS (COMPUTER PROGRAMS) | RT | OPERATIONAL PROBLEMS<br>3406<br>RT AIRLINE OPERATIONS<br>% OPERATIONS<br>% PROBLEMS<br>SYSTEMS ENGINEERING                                                                                                                                                                                                                                                                                                                                                                                 |
| OPENINGS                                                                                                                                                                               | O202 1305 1504 2806 3407<br>UF CUT-OUTS<br>GS #OPENINGS<br>. APERTURES<br>.. IRISES (MECHANICAL APERTURES)<br>.. SYNTHETIC APERTURES<br>.. PORTS (OPENINGS)<br>. SLITS<br>ANNUAL DUCTS<br>CAVITIES<br>CRACKS<br>CURTAINS<br>DOORS<br>DUCT GEOMETRY<br>DUCTS<br>EGRESS<br>EXHAUST NOZZLES<br>EXHAUST SYSTEMS<br>GAPS<br>GATES (OPENINGS)<br>INGRESS (SPACECRAFT PASSAGEWAY)<br>INLET NOZZLES<br>INTAKE SYSTEMS<br>ORIFICES<br>OUTLETS<br>PASSAGEWAYS<br>PERFORATED PLATES<br>PIPE NOZZLES<br>SLOTS<br>VENTS<br>WINDOWS (APERTURES) |  | OPERATING TEMPERATURE<br>1408 1504 3303 3501<br>GS TEMPERATURE<br>#OPERATING TEMPERATURE<br>RT AMBIENT TEMPERATURE<br>COMBUSTION TEMPERATURE<br>HIGH TEMPERATURE SUPERCONDUCTORS<br>ROOM TEMPERATURE<br>WALL TEMPERATURE                                                                                                                                                                                                                                         | RT | AIR DROP OPERATIONS<br>AIR TRAFFIC CONTROL<br>AIRLINE OPERATIONS<br>CHEMICAL ENGINEERING<br>CHEMICAL REACTIONS<br>CLINICAL MEDICINE<br>DEPLOYMENT<br>FISHBOWL OPERATION<br>LOADING OPERATIONS<br>MECHANIZATION<br>MISSION PLANNING<br>OPERATIONAL PROBLEMS<br>OPERATIONS RESEARCH<br>ORIFICES<br>PREFLIGHT OPERATIONS<br>PREMATURE OPERATION<br>PRODUCTION ENGINEERING<br>PROGRAMS<br>PROJECTS<br>RESCUE OPERATIONS<br>RUNNING<br>SEQUENCING<br>STRATEGY<br>SURGERY<br>SYSTEMS ENGINEERING |
| OPERATING COSTS<br>3402<br>GS COSTS<br>#OPERATING COSTS<br>RT AIRLINE OPERATIONS<br>ECONOMIC ANALYSIS<br>ENERGY POLICY<br>FUELS<br>MAINTENANCE<br>PRODUCTION COSTS<br>SYSTEMS ANALYSIS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | OPERATIONAL AMPLIFIERS<br>1001 1002 1201<br>GS AMPLIFIERS<br>#OPERATIONAL AMPLIFIERS<br>RT AMPLIFIER DESIGN<br>ANALOG CIRCUITS<br>ANALOG COMPUTERS<br>DIFFERENTIAL AMPLIFIERS<br>FEEDBACK AMPLIFIERS<br>LINEAR INTEGRATED CIRCUITS<br>TRANSISTOR AMPLIFIERS                                                                                                                                                                                                      |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | OPERATIONAL CALCULUS<br>1902<br>RT % APPLICATIONS OF MATHEMATICS<br>CALCULUS<br>CALCULUS OF VARIATIONS<br>DIFFERENTIAL EQUATIONS<br>FOURIER ANALYSIS<br>INTEGRAL CALCULUS<br>LINEAR EQUATIONS                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | OPERATIONAL HAZARDS<br>O203 O502 1103 1505 3406<br>GS HAZARDS                                                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | OPERATIONS RESEARCH<br>3404 3405 3406 4001<br>GS OPTIMIZATION<br>#OPERATIONS RESEARCH<br>RT % APPLICATIONS OF MATHEMATICS<br>COMPUTER SYSTEMS SIMULATION<br>COMPUTERIZED SIMULATION                                                                                                                                                                                                                                                                              |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



# NASA THESAURUS HIERARCHICAL UPDATE

|                              |                                    |  |  |
|------------------------------|------------------------------------|--|--|
| CONSTRAINTS                  |                                    |  |  |
| CONTROL SYSTEMS DESIGN       |                                    |  |  |
| CRITICAL PATH METHOD         |                                    |  |  |
| DECISION THEORY              |                                    |  |  |
| DELPHI METHOD (FORECASTING)  |                                    |  |  |
| DYNAMIC PROGRAMMING          |                                    |  |  |
| EXPERIMENT DESIGN            |                                    |  |  |
| FORECASTING                  |                                    |  |  |
| FUNCTIONS (MATHEMATICS)      |                                    |  |  |
| GAME THEORY                  |                                    |  |  |
| INFORMATION THEORY           |                                    |  |  |
| LAGRANGE MULTIPLIERS         |                                    |  |  |
| LINEAR PREDICTION            |                                    |  |  |
| LINEAR PROGRAMMING           |                                    |  |  |
| MANAGEMENT                   |                                    |  |  |
| MANAGEMENT METHODS           |                                    |  |  |
| MANAGEMENT PLANNING          |                                    |  |  |
| MATHEMATICAL MODELS          |                                    |  |  |
| MATHEMATICAL PROGRAMMING     |                                    |  |  |
| MATRIX MANAGEMENT            |                                    |  |  |
| MINIMA                       |                                    |  |  |
| MINIMAX TECHNIQUE            |                                    |  |  |
| MISSION PLANNING             |                                    |  |  |
| NONLINEAR PROGRAMMING        |                                    |  |  |
| OPERATIONS                   |                                    |  |  |
| % PATHS                      |                                    |  |  |
| PATTERN METHOD (FORECASTING) |                                    |  |  |
| PROBABILITY THEORY           |                                    |  |  |
| PROBE METHOD (FORECASTING)   |                                    |  |  |
| PROFILE METHOD (FORECASTING) |                                    |  |  |
| PROJECT PLANNING             |                                    |  |  |
| QUALITY CONTROL              |                                    |  |  |
| QUEUEING THEORY              |                                    |  |  |
| RAND PROJECT                 |                                    |  |  |
| RAYLEIGH DISTRIBUTION        |                                    |  |  |
| RESEARCH AND DEVELOPMENT     |                                    |  |  |
| RESEARCH MANAGEMENT          |                                    |  |  |
| RISK                         |                                    |  |  |
| SADDLE POINTS (GAME THEORY)  |                                    |  |  |
| SEQUENCING                   |                                    |  |  |
| SIMULATION                   |                                    |  |  |
| STATISTICAL ANALYSIS         |                                    |  |  |
| STOCHASTIC PROCESSES         |                                    |  |  |
| STRATEGY                     |                                    |  |  |
| % SYNTHESIS                  |                                    |  |  |
| SYNTHESIS (CHEMISTRY)        |                                    |  |  |
| SYSTEMS ANALYSIS             |                                    |  |  |
| SYSTEMS ENGINEERING          |                                    |  |  |
| SYSTEMS MANAGEMENT           |                                    |  |  |
| SYSTEMS SIMULATION           |                                    |  |  |
| TRAVELING SALESMAN PROBLEM   |                                    |  |  |
| URBAN DEVELOPMENT            |                                    |  |  |
| WAR GAMES                    |                                    |  |  |
| OPERATOR PERFORMANCE         |                                    |  |  |
|                              | 0502 3406                          |  |  |
|                              | GS HUMAN PERFORMANCE               |  |  |
|                              | RT #OPERATOR PERFORMANCE           |  |  |
|                              | ASTRONAUT PERFORMANCE              |  |  |
|                              | COMPUTER SYSTEMS PERFORMANCE       |  |  |
|                              | MENTAL PERFORMANCE                 |  |  |
|                              | % PERFORMANCE                      |  |  |
|                              | PILOT PERFORMANCE                  |  |  |
|                              | PSYCHOMOTOR PERFORMANCE            |  |  |
|                              | % OPERATORS                        |  |  |
|                              | 0502 1902                          |  |  |
|                              | SN (USE OF A MORE SPECIFIC TERM IS |  |  |
|                              | RECOMMENDED--CONSULT THE TERMS     |  |  |
|                              | LISTED BELOW)                      |  |  |
|                              | RT OPERATORS (MATHEMATICS)         |  |  |
|                              | OPERATORS (PERSONNEL)              |  |  |
|                              | REACTOR CORES                      |  |  |
|                              | OPERATORS (MATHEMATICS)            |  |  |
|                              | 1902                               |  |  |
|                              | UF DIFFERENTIAL OPERATORS          |  |  |
|                              | FREDHOLM OPERATORS                 |  |  |
|                              | GS #OPERATORS (MATHEMATICS)        |  |  |
|                              | .BERGMAN OPERATOR                  |  |  |
|                              | .LINEAR OPERATORS                  |  |  |
|                              | FUNCTIONS (MATHEMATICS)            |  |  |
|                              | INTEGRAL TRANSFORMATIONS           |  |  |
|                              | LAPLACE TRANSFORMATION             |  |  |
|                              | MATRIX THEORY                      |  |  |
|                              | % OPERATORS                        |  |  |
|                              | PERTURBATION THEORY                |  |  |
|                              | S MATRIX THEORY                    |  |  |
|                              | OPERATORS (PERSONNEL)              |  |  |
|                              | 3406                               |  |  |
|                              | GS PERSONNEL                       |  |  |
|                              | #OPERATORS (PERSONNEL)             |  |  |
|                              | ..PILOTS (PERSONNEL)               |  |  |
|                              | ...AIRCRAFT PILOTS                 |  |  |
|                              | ....TEST PILOTS                    |  |  |
|                              | RT % OPERATORS                     |  |  |
|                              | OPHIUCHI CLOUDS                    |  |  |
|                              | 3009                               |  |  |
|                              | RT CLOUD PHYSICS                   |  |  |
|                              | % CLOUDS                           |  |  |
|                              | INTERSTELLAR GAS                   |  |  |
|                              | INTERSTELLAR MATTER                |  |  |
|                              | NEBULAE                            |  |  |
|                              | OPHTHALMODYNAMOMETRY               |  |  |
|                              | 0404 0405                          |  |  |
|                              | RT BLOOD PRESSURE                  |  |  |
|                              | EYE (ANATOMY)                      |  |  |
|                              | VISION                             |  |  |
|                              | OPHTHALMOLOGY                      |  |  |
|                              | 0401 0404 0405 0408                |  |  |
|                              | GS MEDICAL SCIENCE                 |  |  |
|                              | #OPHTHALMOLOGY                     |  |  |
|                              | RT ELECTRONYSTAGMOGRAPHY           |  |  |
|                              | EYE (ANATOMY)                      |  |  |
|                              | EYE DISEASES                       |  |  |
|                              | EYE EXAMINATIONS                   |  |  |
|                              | MIOSIS                             |  |  |
|                              | VESTIBULAR NYSTAGMUS               |  |  |
|                              | OPIK THEORY                        |  |  |
|                              | 3001 3002 3009                     |  |  |
|                              | RT NEBULAE                         |  |  |
|                              | ORION CONSTELLATION                |  |  |
|                              | ORION NEBULA                       |  |  |
|                              | SUPERNOVAE                         |  |  |
|                              | % THEORIES                         |  |  |
|                              | OPTICAL ABSORPTION                 |  |  |
|                              | USE ELECTROMAGNETIC ABSORPTION     |  |  |
|                              | LIGHT TRANSMISSION                 |  |  |
|                              | OPTICAL ACTIVITY                   |  |  |
|                              | 2302 2306 2310                     |  |  |
|                              | RT BIOCHEMISTRY                    |  |  |
|                              | CARBOHYDRATES                      |  |  |
|                              | % OPTICS                           |  |  |
|                              | ORGANIC CHEMISTRY                  |  |  |
|                              | POLARIMETRY                        |  |  |
|                              | POLARIZED LIGHT                    |  |  |
|                              | STEREOCHEMISTRY                    |  |  |
|                              | OPTICAL AMPLIFIERS                 |  |  |
|                              | USE LIGHT AMPLIFIERS               |  |  |
|                              | OPTICAL BISTABILITY                |  |  |
|                              | 2310                               |  |  |
|                              | GS ELECTROMAGNETIC PROPERTIES      |  |  |
|                              | .OPTICAL PROPERTIES                |  |  |
|                              | .#OPTICAL BISTABILITY              |  |  |
|                              | RT FOUR-WAVE MIXING                |  |  |
|                              | HYSTERESIS                         |  |  |
|                              | INTEGRATED OPTICS                  |  |  |
|                              | LIGHT TRANSMISSION                 |  |  |
|                              | NONLINEAR OPTICS                   |  |  |
|                              | OPTICAL DATA STORAGE MATERIALS     |  |  |
|                              | OPTICAL EQUIPMENT                  |  |  |
|                              | OPTICAL MEASURING INSTRUMENTS      |  |  |
|                              | OPTICAL MEMORY (DATA STORAGE)      |  |  |
|                              | OPTICAL SWITCHING                  |  |  |
|                              | OPTICAL WAVEGUIDES                 |  |  |
|                              | SWITCHING CIRCUITS                 |  |  |



# NASA THESAURUS HIERARCHICAL UPDATE

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                     | <ul style="list-style-type: none"> <li>..OPTICAL DISKS</li> <li>CD-ROM</li> <li>DATA STORAGE</li> <li>LASER APPLICATIONS</li> <li>OPTICAL DATA PROCESSING</li> <li>OPTICAL EQUIPMENT</li> <li>OPTICAL MEMORY (DATA STORAGE)</li> <li>VIDEO DISKS</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>..CATHETOMETERS</li> <li>..DIFFRACTOMETERS</li> <li>..EBERT SPECTROMETERS</li> <li>..ELLIPSOMETERS</li> <li>..ETALONS</li> <li>..GEODIMETERS</li> <li>..HAPLOSCHOPES</li> <li>..INFRARED SPECTROMETERS</li> <li>..FILTER WHEEL INFRARED SPECTROMETERS</li> <li>..LIGHT SCATTERING METERS</li> <li>..MICRODENSITOMETERS</li> <li>..NEPHELOMETERS</li> <li>..OCULOMETERS</li> <li>..OPTICAL PYROMETERS</li> <li>..OPTICAL RANGE FINDERS</li> <li>..LASER RANGE FINDERS</li> <li>..PHOTOGNOMIOMETERS</li> <li>..PHOTOMETERS</li> <li>..ELECTROPHOTOMETERS</li> <li>..ULTRAVIOLET SPECTROMETERS</li> <li>....TOTAL OZONE MAPPING SPECTROMETER</li> <li>..ULTRAVIOLET SPECTROPHOTOMETERS</li> <li>..POLARIMETERS</li> <li>..REFLECTOMETERS</li> <li>..MICROWAVE REFLECTOMETERS</li> <li>..REFRACTOMETERS</li> <li>..SEXTANTS</li> <li>..SPECTROPHOTOMETERS</li> <li>..INFRARED SPECTROPHOTOMETERS</li> <li>..ULTRAVIOLET SPECTROPHOTOMETERS</li> <li>..TRANSITS</li> <li>..THEODOLITES</li> <li>....CINETHEODOLITES</li> <li>..TRANSMISSOMETERS</li> <li>..OPTICAL MICROSCOPES</li> <li>..OPTICAL SCANNERS</li> <li>..FLYING SPOT SCANNERS</li> <li>..MULTISPECTRAL BAND SCANNERS</li> <li>..THEMATIC MAPPERS (LANDSAT)</li> <li>..PERISCOPIES</li> <li>..PHOTOGRAPHIC RECTIFIERS</li> <li>..POLARISCOPIES</li> <li>..SENARMONT POLARISCOPIES</li> <li>..PRISMS</li> <li>..PRISMATIC BARS</li> <li>..SCATTER PLATES (OPTICS)</li> <li>..SPECTROHELIOGRAPHS</li> <li>..STROBOSCOPIES</li> <li>..WIDE ANGLE LENSES</li> <li>ABSORPTION SPECTROSCOPY</li> <li>ACOUSTIC MICROSCOPES</li> <li>CIRCUMSOLAR TELESCOPES</li> <li>DENSITOMETERS</li> </ul> | <ul style="list-style-type: none"> <li>FABRY-PEROT SPECTROMETERS</li> <li>GEOMETRICAL OPTICS</li> <li>HORIZON SCANNERS</li> <li>INFRARED INTERFEROMETERS</li> <li>INTERFEROMETERS</li> <li>LENSES</li> <li>LOOK ANGLES (ELECTRONICS)</li> <li>MACH-ZEHNDER INTERFEROMETERS</li> <li>MICROCHANNELS</li> <li>MICROSCOPES</li> <li>MIRRORS</li> <li>MONOCHROMATORS</li> <li>OPTICAL BISTABILITY</li> <li>OPTICAL COMPUTERS</li> <li>OPTICAL CONTROL</li> <li>OPTICAL DISKS</li> <li>% OPTICS</li> <li>OPTOGALVANIC SPECTROSCOPY</li> <li>PHOTOGRAPHIC EQUIPMENT</li> <li>RADIO TELESCOPES</li> <li>REFLECTING TELESCOPES</li> <li>REFRACTING TELESCOPES</li> <li>RETICLES</li> <li>SCANNER PROJECT</li> <li>SCANNERS</li> <li>SPECTROMETERS</li> <li>TELESCOPES</li> <li>TRIPODS</li> <li>VIDEO EQUIPMENT</li> </ul> |
| OPTICAL EMISSION<br>USE LIGHT EMISSION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2306                                   | OPTICAL EMISSION SPECTROSCOPY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| GS                                     | <ul style="list-style-type: none"> <li>2306 2310 2402</li> <li>SPECTROSCOPY</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RT                                     | <ul style="list-style-type: none"> <li>#OPTICAL EMISSION SPECTROSCOPY</li> <li>..LASER SPECTROSCOPY</li> <li>AURORAL SPECTROSCOPY</li> <li>ELECTRON SPECTROSCOPY</li> <li>EMISSION SPECTRA</li> <li>LIGHT (VISIBLE RADIATION)</li> <li>% OPTICS</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| OPTICAL EQUIPMENT                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 0501                                   | 1412 2310                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| GS                                     | <ul style="list-style-type: none"> <li>#OPTICAL EQUIPMENT</li> <li>.BINOCULARS</li> <li>.CAMERAS</li> <li>..BAKER-NUNN CAMERA</li> <li>..BALLISTIC CAMERAS</li> <li>..DELFT CAMERA</li> <li>..DIFFRACTION LIMITED CAMERAS</li> <li>..FAINT OBJECT CAMERA</li> <li>..HIGH SPEED CAMERAS</li> <li>..FRAMING CAMERAS</li> <li>..I2S CAMERAS</li> <li>..LALLEMAND CAMERAS</li> <li>..MULTISPECTRAL BAND CAMERAS</li> <li>..PANORAMIC CAMERAS</li> <li>..PINHOLE CAMERAS</li> <li>..SCHMIDT CAMERAS</li> <li>..STREAK CAMERAS</li> <li>..TELEVISION CAMERAS</li> <li>..COLLIMATORS</li> <li>..ENDOSCOPES</li> <li>..EYEPieces</li> <li>..HELIOMETERS</li> <li>..PYROHELIOIMETERS</li> <li>..IMAGE CONVERTERS</li> <li>..CELESCOPES</li> <li>..IMAGE TUBES</li> <li>..THERMICONs</li> <li>..LASER DOPPLER VELOCIMETERS</li> <li>..OPTICAL GYROSCOPES</li> <li>..OPTICAL MEASURING INSTRUMENTS</li> </ul> | <ul style="list-style-type: none"> <li>OPTICAL FIBERS</li> <li>0702 2310</li> <li>GS</li> <li>FIBERS</li> <li>#OPTICAL FIBERS</li> <li>..SCINTILLATING FIBERS</li> <li>WAVEGUIDES</li> <li>..OPTICAL WAVEGUIDES</li> <li>..#OPTICAL FIBERS</li> <li>COMMUNICATION CABLES</li> <li>FIBER OPTICS</li> <li>FLY BY LIGHT CONTROL</li> <li>GLASS FIBERS</li> <li>OPTICAL COMMUNICATION</li> <li>OPTICAL MATERIALS</li> <li>TRANSMISSION LINES</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| OPTICAL FILTERS                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 0501                                   | 1601 2306 2310 1412                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| GS                                     | <ul style="list-style-type: none"> <li>ELECTROMAGNETIC WAVE FILTERS</li> <li>#OPTICAL FILTERS</li> <li>..BIREFRINGENT FILTERS</li> <li>..INFRARED FILTERS</li> <li>..ULTRAVIOLET FILTERS</li> <li>ADAPTIVE FILTERS</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

BANDPASS FILTERS  
 BANDSTOP FILTERS  
 DIAPHRAGMS (MECHANICS)  
 DIDYMIUM  
 ELECTRIC FILTERS  
 FILTERGRAMS  
 % FILTERS  
 % GRATINGS  
 GRATINGS (SPECTRA)  
 HIGH PASS FILTERS  
 LENSES  
 LOW PASS FILTERS  
 OPTICAL RELAY SYSTEMS  
 % OPTICS  
 PHOTOGRAPHIC EQUIPMENT  
 PHOTOGRAPHIC FILM  
 ROWLAND CIRCLES  
 SUNGLASSES  
 TRANSMISSION  
 OPTICAL FLOW (IMAGE ANALYSIS)  
 2310  
 RT  
 COMPUTER VISION  
 IMAGE ANALYSIS  
 IMAGE PROCESSING  
 % OPTICS  
 SCENE ANALYSIS  
 THREE DIMENSIONAL MOTION  
 OPTICAL GENERATORS  
 USE LASER CAVITIES  
 OPTICAL GYROSCOPES  
 1403 2103 2310  
 GS  
 GYROSCOPES  
 #OPTICAL GYROSCOPES  
 OPTICAL EQUIPMENT  
 #OPTICAL GYROSCOPES  
 LASER GYROSCOPES  
 RT  
 % OPTICS  
 SAGNAC EFFECT  
 OPTICAL HETERODYNING  
 0905 2309 2310 2402  
 GS  
 HETERODYNING  
 #OPTICAL HETERODYNING  
 RT  
 DOPPLER EFFECT  
 LIGHT MODULATION  
 % OPTICS  
 OPTICAL ILLUSION  
 0408 0410 2310  
 GS  
 PSYCHOLOGICAL EFFECTS  
 .ILLUSIONS  
 :#OPTICAL ILLUSION  
 ...ELEVATOR ILLUSION  
 RT  
 MOON ILLUSION  
 % OPTICS  
 OPTICAL IMAGES  
 USE IMAGES  
 OPTICAL MASER MODULATION  
 USE LIGHT MODULATION  
 OPTICAL MASERS  
 USE LASERS  
 OPTICAL MATERIALS  
 2310  
 RT  
 GLASS  
 INFRARED WINDOWS  
 LENSES  
 % MATERIALS  
 MIRRORS  
 OPTICAL FIBERS  
 WINDOWS (APERTURES)  
 OPTICAL MEASUREMENT  
 0501 1406 1412 2310 1407 1411 3501  
 SN  
 (MEASUREMENTS OF OPTICAL  
 PROPERTIES, QUANTITIES OR  
 CONDITIONS)  
 GS #OPTICAL MEASUREMENT  
 .COLORIMETRY  
 .OPTOMETRY  
 .PHOTOMETRY  
 ..ASTRONOMICAL PHOTOMETRY  
 ..STELLAR SPECTROPHOTOMETRY  
 ..ELECTROPHOTOMETRY  
 ..INFRARED PHOTOMETRY  
 ..SPECTROPHOTOMETRY  
 ..STELLAR SPECTROPHOTOMETRY  
 ..TELEPHOTOMETRY  
 ..ULTRAVIOLET PHOTOMETRY  
 ..VISUAL PHOTOMETRY  
 .POLARIMETRY  
 ..ASTRONOMICAL POLARIMETRY  
 CHEMICAL ANALYSIS  
 COLLIMATORS  
 DENSITOMETERS  
 DIFFRACTOMETERS  
 ELECTRO-OPTICAL PHOTOGRAPHY  
 ELLIPSONOMETRY  
 EMISSIVITY  
 ETALONS  
 FARADAY EFFECT  
 GAMMA RAY SPECTROMETERS  
 GEODIMETERS  
 GEOMETRICAL OPTICS  
 GRAZING INCIDENCE  
 IN SITU MEASUREMENT  
 INFRARED INTERFEROMETERS  
 INTERFEROMETERS  
 LIGHT (VISIBLE RADIATION)  
 % MEASUREMENT  
 MICRODENSITOMETERS  
 MODULATION TRANSFER FUNCTION  
 NEPHELOMETERS  
 NONINTRUSIVE MEASUREMENT  
 % OPTICS  
 PHASE CONTRAST  
 PHOTOGRAPHIC MEASUREMENT  
 PHOTOMETERS  
 POLARIMETERS  
 RAY TRACING  
 REFLECTANCE  
 REFLECTOMETERS  
 REFRACTOMETERS  
 RONCHI TEST  
 SPECTRAL SIGNATURES  
 SPECTROMETERS  
 SPECTROPHOTOMETERS  
 STROBOSCOPES  
 OPTICAL MEASURING INSTRUMENTS  
 0501 1404 1406 1407 1412 2310 3501  
 SN  
 (INSTRUMENTS UTILIZING OPTICAL  
 PRINCIPLES FOR MEASUREMENT)  
 UF  
 OPTICAL SENSORS  
 GS  
 MEASURING INSTRUMENTS  
 #OPTICAL MEASURING INSTRUMENTS  
 ..CATHETOMETERS  
 ..DIFFRACTOMETERS  
 ..EBERT SPECTROMETERS  
 ..ELLIPSONETERS  
 ..ETALONS  
 ..GEODIMETERS  
 ..HAPLOSOPES  
 ..INFRARED SPECTROMETERS  
 ...FILTER WHEEL INFRARED  
 SPECTROMETERS  
 ...LIGHT SCATTERING METERS  
 ...MICRODENSITOMETERS  
 ...NEPHELOMETERS  
 ...OCULOMETERS  
 ...OPTICAL PYROMETERS  
 ...OPTICAL RANGE FINDERS  
 ...LASER RANGE FINDERS  
 ...PHOTOGONIOMETERS  
 ...PHOTOMETERS  
 ...ELECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROMETERS  
 ....TOTAL OZONE MAPPING  
 SPECTROMETER

# NASA THESAURUS HIERARCHICAL UPDATE

...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...POLARIMETERS  
 ...REFLECTOMETERS  
 ...MICROWAVE REFLECTOMETERS  
 ...REFRACTOMETERS  
 ...SEXTANTS  
 ...SPECTROPHOTOMETERS  
 ...INFRARED SPECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...TRANSITS  
 ...THEODOLITES  
 ...CINETHEODOLITES  
 ...TRANSMISSOMETERS  
 OPTICAL EQUIPMENT  
 #OPTICAL MEASURING INSTRUMENTS  
 ...CATHETOMETERS  
 ...DIFFRACTOMETERS  
 ...EBERT SPECTROMETERS  
 ...ELLIPSONETERS  
 ...ETALONS  
 ...GEODIMETERS  
 ...HAPLOSOPES  
 ...INFRARED SPECTROMETERS  
 ...FILTER WHEEL INFRARED  
 SPECTROMETERS  
 ...LIGHT SCATTERING METERS  
 ...MICRODENSITOMETERS  
 ...NEPHELOMETERS  
 ...OCULOMETERS  
 ...OPTICAL PYROMETERS  
 ...OPTICAL RANGE FINDERS  
 ...LASER RANGE FINDERS  
 ...PHOTOGNOMETERS  
 ...PHOTOMETERS  
 ...ELECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROMETERS  
 ....TOTAL OZONE MAPPING  
 SPECTROMETER  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...POLARIMETERS  
 ...REFLECTOMETERS  
 ...MICROWAVE REFLECTOMETERS  
 ...REFRACTOMETERS  
 ...SEXTANTS  
 ...SPECTROPHOTOMETERS  
 ...INFRARED SPECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...TRANSITS  
 ...THEODOLITES  
 ...CINETHEODOLITES  
 ...TRANSMISSOMETERS  
 ABSORPTION SPECTROSCOPY  
 CINESPECTROGRAPHS  
 COLORIMETRY  
 DENSITOMETERS

RT

FABRY-PEROT SPECTROMETERS  
 FAINT OBJECT CAMERA  
 GONIOMETERS  
 GUIDANCE SENSORS  
 INFRARED INTERFEROMETERS  
 INTERFEROMETERS  
 LASER DOPPLER VELOCIMETERS  
 MACH-ZEHNDER INTERFEROMETERS  
 MICROSCOPES  
 MIROS SYSTEM  
 MONOCHROMATORS  
 MULTISPECTRAL TRACKING TELESCOPES  
 OPTICAL BISTABILITY  
 % OPTICS  
 OPTOGALVANIC SPECTROSCOPY  
 PERISCOPIES  
 POLARIMETRY  
 POLARISCOPIES  
 RADIATION MEASURING INSTRUMENTS  
 REFLECTING TELESCOPES  
 REFRACTING TELESCOPES  
 SELF FOCUSING  
 SENARMONT POLARISCOPIES  
 SOLAR INSTRUMENTS  
 TELEPHOTOMETRY  
 TELESCOPES  
 OPTICAL MEMORY (DATA STORAGE)  
 0802 0803 1407  
 RT  
 CD-ROM  
 COHERENT LIGHT  
 COMPUTER STORAGE DEVICES  
 % DATA  
 HOLOGRAPHY  
 LASERS  
 OPTICAL BISTABILITY  
 OPTICAL COMPUTERS  
 OPTICAL DATA STORAGE MATERIALS  
 OPTICAL DISKS  
 % OPTICS  
 VIDEO DISKS  
 OPTICAL METHODS  
 USE OPTICS  
 OPTICAL MICROSCOPES  
 0501 2306 2310  
 GS  
 MICROSCOPES  
 #OPTICAL MICROSCOPES  
 OPTICAL EQUIPMENT  
 #OPTICAL MICROSCOPES  
 RT  
 ELECTRON MICROSCOPES  
 % OPTICS  
 OPTICAL MODULATION

USE LIGHT MODULATION  
 OPTICAL PATHS  
 1601 2306 2310  
 RT  
 DIFFRACTION PATHS  
 GEOMETRICAL OPTICS  
 MULTIPATH TRANSMISSION  
 % OPTICS  
 % PATHS  
 PHASE CONTRAST  
 PHOTON BEAMS  
 SAGNAC EFFECT  
 UNDERWATER OPTICS  
 VOIGT EFFECT  
 WAVE DISPERSION  
 OPTICAL POLARIZATION  
 0710 2306 2310 2402  
 RT  
 CIRCULAR POLARIZATION  
 LINEAR POLARIZATION  
 OPTICAL PROPERTIES  
 % OPTICS  
 % POLARIZATION  
 POLARIZED LIGHT  
 POLARIZERS  
 POLAROGRAPHY  
 OPTICAL PROPERTIES  
 2306 2310 2402  
 SN  
 (INCLUDES PROPERTIES AND EFFECTS  
 OF VISIBLE, INFRARED AND  
 ULTRAVIOLET ELECTROMAGNETIC WAVES)  
 GS  
 ELECTROMAGNETIC PROPERTIES  
 #OPTICAL PROPERTIES  
 ..ABSORPTANCE  
 ..ABSORPTIVITY  
 ..BIREFRINGENCE  
 ..KERR ELECTROOPTICAL EFFECT  
 ..BRIGHTNESS  
 ..BRIGHTNESS DISTRIBUTION  
 ..COLOR  
 ...IRIDESCENCE  
 ...WATER COLOR  
 ...DICHROISM  
 ...LUMINOSITY  
 ...STELLAR LUMINOSITY  
 ...OPACITY  
 ...OPTICAL BISTABILITY  
 ...OPTICAL REFLECTION  
 ...PHOSPHORESCENCE  
 ...PHOTOCONDUCTIVITY  
 ...PHOTOVISCOELASTICITY  
 ...RADIANCE  
 ...REFLECTANCE  
 ...BIDIRECTIONAL REFLECTANCE

| RT                         | GS        | MEASURING INSTRUMENTS            |
|----------------------------|-----------|----------------------------------|
| ...SPECTRAL REFLECTANCE    | GS        | MEASURING INSTRUMENTS            |
| ..REFRACTIVITY             | 1601 2310 | .DISTANCE MEASURING EQUIPMENT    |
| ..SKY BRIGHTNESS           | GS        | ..RANGE FINDERS                  |
| ..STIGMATISM               | RT        | ...#OPTICAL RANGE FINDERS        |
| ..TRANSLUCENCE             | RT        | ...LASER RANGE FINDERS           |
| ..TRANSMISSIVITY           | RT        | ...OPTICAL MEASURING INSTRUMENTS |
| ..TRANSMITTANCE            | RT        | ...#OPTICAL RANGE FINDERS        |
| ..TRANSPARENCE             | RT        | ...LASER RANGE FINDERS           |
| ..TURBIDITY                | RT        | OPTICAL EQUIPMENT                |
| ACOUSTO-OPTICS             | RT        | ..LASER RANGE FINDERS            |
| ALBEDO                     | RT        | ...LASER RANGE FINDERS           |
| BIREFRINGENT FILTERS       | RT        | LUNAR RANGEFINDING               |
| CLARITY                    | RT        | % OPTICS                         |
| COEFFICIENTS               | RT        | OPTICAL REFLECTION               |
| COHERENT RADIATION         | RT        | 2306 2310 2402                   |
| CROSS POLARIZATION         | RT        | GS ELECTROMAGNETIC PROPERTIES    |
| DARKNESS                   | RT        | ..OPTICAL PROPERTIES             |
| DIFFRACTION                | RT        | ..#OPTICAL REFLECTION            |
| ELECTRICAL PROPERTIES      | RT        | REFLECTION                       |
| ELECTROMAGNETIC ABSORPTION | RT        | #OPTICAL REFLECTION              |
| EMITTANCE                  | RT        | ANTIREFLECTION COATINGS          |
| EXCITONS                   | RT        | ELECTROMAGNETIC ABSORPTION       |
| FARADAY EFFECT             | RT        | GEOMETRICAL OPTICS               |
| GEOMETRICAL OPTICS         | RT        | INCIDENT RADIATION               |
| GLARE                      | RT        | INFRARED REFLECTION              |
| GLASS                      | RT        | LIGHT TRANSMISSION               |
| GRADIENT INDEX OPTICS      | RT        | % OPTICS                         |
| HAZE                       | RT        | REFLECTANCE                      |
| INFRARED ABSORPTION        | RT        | REFLECTED WAVES                  |
| ISOTROPY                   | RT        | SPREAD REFLECTION                |
| KERR MAGNETOOPTICAL EFFECT | RT        | OPTICAL RELAY SYSTEMS            |
| LIGHT (VISIBLE RADIATION)  | RT        | O501                             |
| LIGHT TRANSMISSION         | RT        | RT                               |
| LUMENS                     | RT        | ELECTRO-OPTICS                   |
| LUMINANCE                  | RT        | IMAGING TECHNIQUES               |
| LUNAR ALBEDO               | RT        | LASER APPLICATIONS               |
| METALLIC GLASSES           | RT        | OPTICAL DATA PROCESSING          |
| OPALESCE                   | RT        | OPTICAL FILTERS                  |
| OPTICAL POLARIZATION       | RT        | OPTICAL RESONATORS               |
| % OPTICS                   | RT        | OPTICAL SWITCHING                |
| % ORIENTATION              | RT        | % OPTICS                         |
| PHOTOELECTRICITY           | RT        | % SYSTEMS                        |
| PHOTONS                    | RT        | PATTERN RECOGNITION              |
| PHOTOTROPISM               | RT        | % SYSTEMS                        |
| PHYSICAL OPTICS            | RT        | OPTICAL RESONANCE                |
| % PHYSICAL PROPERTIES      | RT        | 2306 2310 2502 1601              |
| POLARIZATION (WAVES)       | RT        | GS EMISSION                      |
| PROPERTIES                 | RT        | ..LIGHT EMISSION                 |
| % SOLID STATE PHYSICS      | RT        | ..LUMINESCENCE                   |
| SURFACE PROPERTIES         | RT        | ..#OPTICAL RESONANCE             |
| THERMOCHROMATIC MATERIALS  | RT        | RESONANCE                        |
| THERMODYNAMIC PROPERTIES   | RT        | #OPTICAL RESONANCE               |
| VISIBILITY                 | RT        | NUCLEARPUMPED LASERS             |
| WAVE DISPERSION            | RT        | NUCLEARPUMPED LASERS             |

# NASA THESAURUS HIERARCHICAL UPDATE

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% OPTICS
  PLASMA RADIATION
  PLASMA SPECTRA
  RESONANCE LINES
  SPECTRUM ANALYSIS

OPTICAL RESONATORS
  0705 2306
  GS
  #OPTICAL RESONATORS
  RT
  FIELD MODE THEORY
  LASER MODES
  LASER OUTPUTS
  LASERS
  LIGHT MODULATION
  MIRRORS
  OPTICAL RELAY SYSTEMS
  % OPTICS

OPTICAL SATELLITE TRACKING PROGRAM
  0709 2310 3409
  RT % OPTICS
  SATELLITE TRACKING

OPTICAL SCANNERS
  2306 2310 2402
  GS
  OPTICAL EQUIPMENT
  #OPTICAL SCANNERS
  ..FLYING SPOT SCANNERS
  ...MULTISPECTRAL BAND SCANNERS
  ...THEMATIC MAPPERS (LANDSAT)
  SCANNERS
  #OPTICAL SCANNERS
  ..FLYING SPOT SCANNERS
  ...MULTISPECTRAL BAND SCANNERS
  ...THEMATIC MAPPERS (LANDSAT)
  RT
  CHARACTER RECOGNITION
  DATA ACQUISITION
  MONITORS
  % OPTICS
  PHOTON BEAMS
  READERS
  TELEVISION CAMERAS

OPTICAL SENSORS
  USE OPTICAL MEASURING INSTRUMENTS

OPTICAL SIGNALS
  USE OPTICAL COMMUNICATION

OPTICAL SLANT RANGE
  2310 0709 1109
  GS
  DISTANCE
  #OPTICAL SLANT RANGE
  RT % OPTICS

RADAR RANGE
  OPTICAL SPECTRUM
  USE LIGHT (VISIBLE RADIATION)
  SPECTRA

OPTICAL SWITCHING
  2304 2306 2310 2402
  UF
  ELECTRO-OPTICAL SWITCHING
  OPTOELECTRONIC SWITCHING
  PHOTONIC SWITCHING
  GS
  SWITCHING
  #OPTICAL SWITCHING
  RT
  ACOUSTO-OPTICS
  ELECTRO-OPTICS
  INTEGRATED OPTICS
  LIGHT MODULATION
  MAGNETO-OPTICS
  OPTICAL BISTABILITY
  OPTICAL RELAY SYSTEMS
  OPTOELECTRONIC DEVICES
  PHOTONICS
  SEMICONDUCTOR LASERS
  SWITCHING CIRCUITS

OPTICAL THICKNESS
  1202 1203 1411 2306 2310 3009
  UF
  OPTICAL DEPTH
  RT
  ANTIREFLECTION COATINGS
  FERMAT PRINCIPLE
  % OPTICS
  REFRACTIVITY
  THICKNESS

OPTICAL TRACKING
  0709 1109 2310
  UF
  VISUAL TRACKING
  GS
  TRACKING (POSITION)
  #OPTICAL TRACKING
  RT
  BALLISTIC CAMERAS
  BORESIGHT ERROR
  BORESIGHTS
  COMPENSATORY TRACKING
  GLOBAL TRACKING NETWORK
  INFRARED TRACKING
  MINITRACK SYSTEM
  MULTIPLE TARGET TRACKING
  MULTISPECTRAL TRACKING TELESCOPES
  OCULOMETERS
  % OPTICS
  PHOTOGRAPHIC TRACKING
  RANGE AND RANGE RATE TRACKING
  SPACE DETECTION AND TRACKING SYSTEM
  SPACECRAFT TRACKING
  STDN (NETWORK)

OPTICAL TRANSFER FUNCTION
  0710 1003 1412 1902 2310
  UF
  QTF
  GS
  FUNCTIONS (MATHEMATICS)
  .TRANSFER FUNCTIONS
  .#OPTICAL TRANSFER FUNCTION
  RT
  ADAPTIVE OPTICS
  COST ANALYSIS
  FIGURE OF MERIT
  IMAGING TECHNIQUES
  MODULATION TRANSFER FUNCTION
  % OPTICS
  % PERFORMANCE
  SPACEBORNE TELESCOPES
  SYSTEM EFFECTIVENESS
  SYSTEMS ANALYSIS
  SYSTEMS ENGINEERING
  TELESCOPES

OPTICAL TRANSITION
  2306 2310
  RT
  ELECTRON TRANSITIONS
  EMISSION SPECTRA
  FRANCK-CONDON PRINCIPLE
  LASING
  LUMINESCENCE
  % OPTICS

OPTICAL WAVEGUIDES
  0601 0712
  GS
  WAVEGUIDES
  #OPTICAL WAVEGUIDES
  ..OPTICAL FIBERS
  RT
  INTEGRATED OPTICS
  LASER OUTPUTS
  LIGHT BEAMS
  LIGHT TRANSMISSION
  OPTICAL BISTABILITY
  % OPTICS
  PHOTONICS
  WAVEGUIDE LASERS

% OPTICS
  2310
  SN
  (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
  UF
  OPTICAL METHODS
  RT
  ACOUSTO-OPTICS
  ADAPTIVE OPTICS
  ANGULAR RESOLUTION
  ASPHERICITY
  ASTIGMATISM
  ATMOSPHERIC OPTICS

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# NASA THESAURUS HIERARCHICAL UPDATE

SIMULATED ANNEALING  
 STATIC MODELS  
 STEEPEST DESCENT METHOD  
 STOPPING  
 SYSTEM IDENTIFICATION  
 TRAJECTORY CONTROL  
 WIENER FILTERING

OPTIMUM CONTROL  
 USE OPTIMAL CONTROL

OPTIMUM THRUST PROGRAMMING  
 USE THRUST PROGRAMMING

OPTIONS  
 1902 3402 3406  
 RT ALTERNATIVES  
 CONTRACTS  
 SELECTION  
 SITE SELECTION  
 SUBCONTRACTS

OPTOELECTRONIC DEVICES  
 2304 2306 2310 2402  
 GS #OPTOELECTRONIC DEVICES

.PHOTODIODES  
 .PHOTOTRANSISTORS  
 RT ELECTRO-OPTICS  
 FIBER OPTICS  
 INTEGRATED CIRCUITS  
 INTEGRATED OPTICS  
 OPTICAL SWITCHING  
 PHOTONICS

OPTOELECTRONIC SWITCHING  
 USE OPTICAL SWITCHING

OPTOGALVANIC SPECTROSCOPY  
 2310

GS SPECTROSCOPY  
 .ABSORPTION SPECTROSCOPY  
 .#OPTOGALVANIC SPECTROSCOPY  
 RT FLAME SPECTROSCOPY  
 FRAUNHOFER LINES  
 GAS SPECTROSCOPY  
 INFRARED SPECTROSCOPY  
 MOLECULAR SPECTROSCOPY  
 OPTICAL EQUIPMENT  
 OPTICAL MEASURING INSTRUMENTS  
 RAMAN SPECTROSCOPY  
 ULTRAVIOLET SPECTROSCOPY  
 VOLT-AMPERE CHARACTERISTICS

OPTOMETRY  
 0405 0501 2306

GS OPTICAL MEASUREMENT  
 #OPTOMETRY  
 RT ANASTIGMATISM  
 BLINDNESS  
 EYE (ANATOMY)  
 HAPLOSOPES  
 % MEASUREMENT  
 MEDICAL SCIENCE  
 VISION

OR-GATES  
 USE GATES (CIRCUITS)

ORAL HYGIENE  
 0405 0408 0411  
 GS HYGIENE  
 #ORAL HYGIENE  
 RT CLEANLINESS  
 DENTISTRY  
 HEALTH  
 PUBLIC HEALTH  
 TEETH  
 TOOTH DISEASES

ORATORY  
 USE PUBLIC SPEAKING

ORBS  
 0705 0710 1302 3107  
 UF ORBITING RADIO BEACON IONOSPHERIC  
 SOUNDER  
 GS ARTIFICIAL SATELLITES  
 .SCIENTIFIC SATELLITES  
 .#ORBS  
 ...ORBS CAL SATELLITE  
 RT IONOSPHERIC PROPAGATION  
 IONOSPHERIC SOUNDING  
 RADIO BEACONS

ORBS CAL SATELLITE  
 0705 0710 1302 3107  
 GS ARTIFICIAL SATELLITES  
 .GRAVITY GRADIENT SATELLITES  
 .#ORBS CAL SATELLITE  
 .SCIENTIFIC SATELLITES  
 .#ORBS  
 ...ORBS CAL SATELLITE  
 RT IONOSPHERIC PROPAGATION  
 IONOSPHERIC SOUNDING  
 RADIO BEACONS

ORBIT CALCULATION  
 1901 1904 3006 3009  
 UF SATELLITE ORBIT CALCULATION  
 GS COMPUTATION

#ORBIT CALCULATION  
 ..MINIMUM VARIANCE ORBIT  
 DETERMINATION  
 RT FLIGHT MECHANICS  
 GODDARD TRAJECTORY DETERMINATION  
 SYSTEM  
 ORBITAL ELEMENTS  
 ORBITAL MECHANICS  
 ORBITAL POSITION ESTIMATION  
 ORBITAL RESONANCES (CELESTIAL  
 MECHANICS)  
 QUADRATURES

ORBIT DECAY  
 1901 1904 3006 3009  
 RT AERODYNAMIC DRAG  
 ATMOSPHERIC ENTRY  
 FLIGHT MECHANICS  
 ORBITAL MECHANICS  
 SATELLITE LIFETIME  
 SPACECRAFT BREAKUP

ORBIT EQUATIONS  
 USE ORBITAL MECHANICS

ORBIT INSERTION  
 3006  
 GS INSERTION  
 #ORBIT INSERTION  
 RT ASCENT TRAJECTORIES  
 ORBITAL MANEUVERS  
 ORBITAL MECHANICS  
 PAYLOAD DELIVERY (STS)  
 SATELLITE ORBITS  
 SPACECRAFT LAUNCHING  
 SPACECRAFT MANEUVERS  
 SPACECRAFT ORBITS  
 TRANSFER ORBITS

ORBIT MANEUVERING ENGINE (SPACE SHUTTLE)  
 2802 3110  
 UF OME  
 GS ENGINES  
 .ROCKET ENGINES  
 ..MICROROCKET ENGINES  
 ..#ORBIT MANEUVERING ENGINE (SPACE  
 SHUTTLE)  
 RT AEROMANEUVERING ORBIT TO ORBIT  
 SHUTTLE  
 ORBITAL MANEUVERS  
 SPACE SHUTTLES

ORBIT PERTURBATION  
 1901 1904 3006  
 UF EVECTION

|                            |                                 |                                         |                                  |
|----------------------------|---------------------------------|-----------------------------------------|----------------------------------|
| GS                         | PERTURBATION                    | SPACECRAFT STRUCTURES                   | ORBITAL SERVICING                |
|                            | #ORBIT PERTURBATION             | ORBITAL BREAKUP                         | POWER MODULES (STS)              |
| RT                         | ..SATELLITE PERTURBATION        | USE SPACECRAFT BREAKUP                  | REMOTELY PILOTED VEHICLES        |
|                            | DRIFT RATE                      |                                         | % SPACECRAFT                     |
|                            | LONG TERM EFFECTS               |                                         |                                  |
|                            | LUNAR EFFECTS                   | ORBITAL ELEMENTS                        | ORBITAL MANEUVERS                |
|                            | ORBITAL ELEMENTS                | 1901 1904 3006 3009                     | 3006 3009                        |
|                            | ORBITAL MECHANICS               | RT APSIDES                              | GS MANEUVERS                     |
|                            | ORBITAL RESONANCES (CELESTIAL   | % ELEMENTS                              | .SPACECRAFT MANEUVERS            |
|                            | MECHANICS)                      | ORBIT CALCULATION                       | .#ORBITAL MANEUVERS              |
|                            | PERTURBATION THEORY             | ORBIT PERTURBATION                      | RT ORBIT INSERTION               |
|                            | SCHACH EFFECT                   | ORBITS                                  | ORBIT MANEUVERING ENGINE (SPACE  |
|                            | VINTI THEORY                    | PERIHELIONS                             | SHUTTLE)                         |
|                            |                                 | PERTURBATION THEORY                     | SPACE NAVIGATION                 |
|                            |                                 |                                         | SPACE SHUTTLES                   |
| ORBIT SPECTRUM UTILIZATION |                                 |                                         |                                  |
| 0706 4001                  |                                 | ORBITAL FLIGHT TEST 1 (SHUTTLE)         | ORBITAL MECHANICS                |
| RT                         | COMMUNICATION SATELLITES        | USE SPACE TRANSPORTATION SYSTEM 1       | 1901 1904 2308 3006 3009         |
|                            | FREQUENCY ASSIGNMENT            | FLIGHT                                  | UF ORBIT EQUATIONS               |
|                            | RADIO RELAY SYSTEMS             |                                         | GS CLASSICAL MECHANICS           |
|                            | SATELLITE ORBITS                | ORBITAL FLIGHT TEST 2 (SHUTTLE)         | .SPACE MECHANICS                 |
|                            | SYSTEMS ENGINEERING             | USE SPACE TRANSPORTATION SYSTEM 2       | .#ORBITAL MECHANICS              |
|                            | TELEVISION SYSTEMS              | FLIGHT                                  | ...KEPLER LAWS                   |
|                            |                                 |                                         | ...MINIMUM VARIANCE ORBIT        |
| ORBIT TRANSFER VEHICLES    |                                 | ORBITAL FLIGHT TEST 3 (SHUTTLE)         | DETERMINATION                    |
| 3110                       |                                 | USE SPACE TRANSPORTATION SYSTEM 3       | AEROMANEUVERING ORBIT TO ORBIT   |
| UF                         |                                 | FLIGHT                                  | SHUTTLE                          |
| GS                         | ORBIT TRANSFER VEHICLES         | ORBITAL FLIGHT TEST 4 (SHUTTLE)         | APSIDES                          |
|                            | .AEROMANEUVERING ORBIT TO ORBIT | USE SPACE TRANSPORTATION SYSTEM 4       | ASTRODYNAMICS                    |
|                            | SHUTTLE                         | FLIGHT                                  | CELESTIAL MECHANICS              |
| RT                         | INERTIAL UPPER STAGE            | ORBITAL FLIGHT TESTS (SHUTTLE)          | CIRCULAR ORBITS                  |
|                            | ORBITAL MANEUVERING VEHICLES    | USE SPACE TRANSPORTATION SYSTEM FLIGHTS | DRIFT RATE                       |
|                            | ORBITAL SERVICING               |                                         | EARTH ORBITAL RENDEZVOUS         |
|                            | PAYLOAD DELIVERY (STS)          |                                         | EARTH ORBITS                     |
|                            | PAYLOAD DEPLOYMENT & RETRIEVAL  |                                         | EARTH-MARS TRAJECTORIES          |
|                            | SYSTEM                          |                                         | EARTH-MERCURY TRAJECTORIES       |
|                            | PAYLOAD RETRIEVAL (STS)         |                                         | EARTH-MOON SYSTEM                |
|                            | SPACE SHUTTLES                  |                                         | ELLIPTICAL ORBITS                |
|                            | SPACE TRANSPORTATION            |                                         | EQUATORIAL ORBITS                |
|                            | SPACE TUGS                      |                                         | FLIGHT MECHANICS                 |
|                            | % SPACECRAFT                    |                                         | FLIGHT OPTIMIZATION              |
|                            | % VEHICLES                      |                                         | GODDARD TRAJECTORY DETERMINATION |
|                            |                                 |                                         | SYSTEM                           |
| ORBITAL ASSEMBLY           |                                 |                                         | HANSEN LUNAR THEORY              |
| 2102 3006 3009 3110        |                                 |                                         | HILL LUNAR THEORY                |
| UF                         | CONSTRUCTION IN SPACE           |                                         | HILL METHOD                      |
|                            | SPACECRAFT ORBITAL ASSEMBLY     |                                         | INTERPLANETARY TRAJECTORIES      |
| GS                         | ASSEMBLING                      |                                         | INTERPLANETARY TRANSFER ORBITS   |
|                            | #ORBITAL ASSEMBLY               |                                         | LAGRANGIAN EQUILIBRIUM POINTS    |
| RT                         | EXPANDABLE STRUCTURES           |                                         | LUNAR ORBITAL RENDEZVOUS         |
|                            | INFLATABLE SPACECRAFT           |                                         | LUNAR ORBITS                     |
|                            | SELF ERECTING DEVICES           |                                         | MANY BODY PROBLEM                |
|                            | SPACE ERECTABLE STRUCTURES      |                                         | % MECHANICS (PHYSICS)            |
|                            | SPACE OPERATIONS CENTER (NASA)  |                                         | MOON-EARTH TRAJECTORIES          |
|                            | SPACE STATION STRUCTURES        |                                         | ORBIT CALCULATION                |
|                            | SPACECRAFT MODULES              |                                         |                                  |

# NASA THESAURUS HIERARCHICAL UPDATE

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ORBIT DECAY
ORBIT INSERTION
ORBIT PERTURBATION
ORBITAL RESONANCES (CELESTIAL MECHANICS)
ORBITS
PARKING ORBITS
PERTURBATION
PLANETARY LANDING
POYNTING-ROBERTSON EFFECT
QUADRATURES
RENDEZVOUS
RENDEZVOUS TRAJECTORIES
ROUND TRIP TRAJECTORIES
SATELLITE ORBITS
SATELLITE PERTURBATION
SPACE NAVIGATION
SPACECRAFT ORBITS
STATIONKEEPING
SWINGBY TECHNIQUE
THRUST PROGRAMMING
TRAJECTORY ANALYSIS
TRANSEARTH INJECTION
TRANSFER ORBITS
TRANSLUNAR INJECTION
TWENTY-FOUR HOUR ORBITS
TWO BODY PROBLEM

ORBITAL MOTION
USE ORBITS

ORBITAL POSITION ESTIMATION
1901 1904 3009 3107 3503 3504
GS ESTIMATING
#ORBITAL POSITION ESTIMATION
RT CELESTIAL SPHERE
GODDARD TRAJECTORY DETERMINATION SYSTEM
NAVIGATION
ORBIT CALCULATION
% ORIENTATION
POSITION (LOCATION)
POSITION ERRORS
% RANGE
SATELLITE ORBITS
SPACECRAFT ORBITS
SPACECRAFT POSITION INDICATORS
STATE ESTIMATION

ORBITAL RENDEZVOUS
1901 1904 3006
UF SATELLITE RENDEZVOUS
GS MANEUVERS
#ORBITAL RENDEZVOUS
..EARTH ORBITAL RENDEZVOUS

..LUNAR ORBITAL RENDEZVOUS
RENDEZVOUS
.SPACE RENDEZVOUS
.#ORBITAL RENDEZVOUS
...EARTH ORBITAL RENDEZVOUS
...LUNAR ORBITAL RENDEZVOUS
ATLAS LAUNCH VEHICLES
MULTIPLE DOCKING ADAPTERS
PAYLOAD RETRIEVAL (STS)
RENDEZVOUS GUIDANCE
RENDEZVOUS SPACECRAFT
RENDEZVOUS TRAJECTORIES
SPACECRAFT DOCKING
SPACECRAFT TRAJECTORIES
TETHERING

RT
ORBITAL RESONANCES (CELESTIAL MECHANICS)
3001 3002 3006 3107
GS RESONANCE
#ORBITAL RESONANCES (CELESTIAL MECHANICS)
RT ASTRODYNAMICS
CELESTIAL MECHANICS
GRAVITATIONAL EFFECTS
LIBRATION
LIBRATIONAL MOTION
ORBIT CALCULATION
ORBIT PERTURBATION
ORBITAL MECHANICS
OSCILLATIONS
PLANETARY ORBITS
PLANETARY SYSTEMS
SATELLITE ORBITS
SOLAR ORBITS

ORBITAL SERVICING
3109
UF SATELLITE REPAIR
RT COLUMBUS SPACE STATION
LARGE SPACE STRUCTURES
MAN TENDED FREE FLYERS
MANNED MANEUVERING UNITS
ORBIT TRANSFER VEHICLES
ORBITAL MANEUVERING VEHICLES
PAYLOAD TRANSFER
SPACE OPERATIONS CENTER (NASA)
SPACE PLATFORMS
SPACE SHUTTLE PAYLOADS
SPACE STATION FREEDOM
SPACE STATIONS
SPACE TRANSPORTATION SYSTEM
SPACE TUGS
TELEROBOTICS

ORBITAL SHOTS

ORBITAL TEST SATELLITE (ESA)
USE OTS (ESA)

ORBITAL TRANSFER ORBITS
USE TRANSFER ORBITS

ORBITAL VELOCITY
2308 3006 3009
GS RATES (PER TIME)
#ORBITAL VELOCITY
VELOCITY
#ORBITAL VELOCITY
RT ANGULAR VELOCITY
ESCAPE VELOCITY
% HYPERVELOCITY
VELOCITY ERRORS

ORBITAL WORKERS
O502 0506 0508 3104
GS PERSONNEL
.FLYING PERSONNEL
..ASTRONAUTS
..#ORBITAL WORKERS
RT ASTRONAUT LOCOMOTION
EXTRAVEHICULAR ACTIVITY
SPACE MAINTENANCE
SPACE TOOLS
WORK CAPACITY

ORBITAL WORKSHOPS
3109
GS ARTIFICIAL SATELLITES
#ORBITAL WORKSHOPS
..SATURN WORKSHOPS
...SATURN 1 WORKSHOP
...SATURN 5 WORKSHOP
..SKYLAB 1
..SKYLAB 2

2102 3006 3110 3409
RT % SHOT
SPACECRAFT LAUNCHING

ORBITAL SIMULATORS
USE SPACE SIMULATORS

ORBITAL SPACE TESTS
O709
RT CRRES (SATELLITE)
ENVIRONMENTAL TESTS
LARGE SPACE STRUCTURES
SPACE MECHANICS
SPACE STATIONS
STRUCTURAL ANALYSIS
% TESTS

```

```

...SKYLAB 3
...SKYLAB 4
MANNED SPACECRAFT
#ORBITAL WORKSHOPS
...SATURN WORKSHOPS
...SATURN 1 WORKSHOP
...SATURN 5 WORKSHOP
...SKYLAB 1
...SKYLAB 2
...SKYLAB 3
...SKYLAB 4
RT
  APOLLO EXTENSION SYSTEM
  CONTAINERLESS MELTS
  MANNED ORBITAL LABORATORIES
  SKYLAB PROGRAM
  SPACE LABORATORIES
  SPACE PROCESSING
  SPACE STATIONS

ORBITALS
  O603 2311 2401
  GS #ORBITALS
    .ELECTRON ORBITALS
    .MOLECULAR ORBITALS
    .SLATER ORBITALS
RT
  JAHN-TELLER EFFECT
  ORBITS
  SCHWARZSCHILD METRIC

ORBITING ASTRONOMICAL OBSERVATORY
  USE OAO

ORBITING DIPOLES
  O707 0710 0901
  GS
    .ELECTRIC CHARGE
    .ELECTRIC DIPOLES
    .#ORBITING DIPOLES
RT
  COMMUNICATION EQUIPMENT
  % DIPOLES

ORBITING FROG OTOLITH
  O401 O404
  GS
    .ARTIFICIAL SATELLITES
    .BIOSATELLITES
    .#ORBITING FROG OTOLITH
    .SPACEBORNE EXPERIMENTS
    .#ORBITING FROG OTOLITH
RT
  BIOLOGICAL EFFECTS
  BIOMETRICS
  BIOTELEMETRY
  INSTRUMENT PACKAGES
  INTERNATIONAL COOPERATION
  ITALIAN SPACE PROGRAM
  OTOLITH ORGANS

ORBITING GEOPHYSICAL OBSERVATORY
  USE OGO

ORBITING LUNAR STATIONS
  3009 3109
  GS
    .ARTIFICIAL SATELLITES
    .LUNAR SATELLITES
    .#ORBITING LUNAR STATIONS
    .SPACE STATIONS
    .#ORBITING LUNAR STATIONS
    LUNAR SPACECRAFT
    .LUNAR SATELLITES
    .#ORBITING LUNAR STATIONS
    STATIONS
    .SPACE STATIONS
    .#ORBITING LUNAR STATIONS
RT
  LUNAR BASES
  % SPACECRAFT

ORBITING RADIO BEACON IONOSPHERIC SOUNDER
  USE ORBIS

ORBITING SOLAR OBSERVATORY
  USE DSO

ORBITRONS
  1406 2401
  RT
    ELECTRON CLOUDS
    ELECTRON TUBES
    IONIZATION GAGES
    SPACE CHARGE
    VACUUM GAGES

ORBITS
  1904 3006 3009
  UF
    ORBITAL MOTION
    PERIODIC ORBITS
  GS #ORBITS
    .CIRCULAR ORBITS
    .STATIONARY ORBITS
    .EARTH ORBITS
    .#GEOSYNCHRONOUS ORBITS
    .TWENTY-FOUR HOUR ORBITS
    .ECCENTRIC ORBITS
    .ELLIPTICAL ORBITS
    .#TRANSFER ORBITS
    .#INTERPLANETARY TRANSFER ORBITS
    .EQUATORIAL ORBITS
    .STATIONARY ORBITS
    .LUNAR ORBITS
    .PLANETARY ORBITS
    .SOLAR ORBITS
    .SPACECRAFT ORBITS
    .SATELLITE ORBITS
    .#GEOSYNCHRONOUS ORBITS

...PARKING ORBITS
...POLAR ORBITS
...STATIONARY ORBITS
...TWENTY-FOUR HOUR ORBITS
...TRANSFER ORBITS
...INTERPLANETARY TRANSFER ORBITS
...TROJAN ORBITS
...STELLAR ORBITS
AIRBORNE RANGE AND ORBIT
DETERMINATION
APEXES
APHELIONS
APOGEES
ARTIFICIAL SATELLITES
ASTRODYNAMICS
CELESTIAL BODIES
CELESTIAL MECHANICS
% CONJUNCTION
EARTH-VENUS TRAJECTORIES
EPHEMERIDES
FLIGHT OPTIMIZATION
FLIGHT PATHS
FOUR BODY PROBLEM
GROUND TRACKS
% INCLINATION
INTERPLANETARY FLIGHT
LUNAR FLIGHT
MANY BODY PROBLEM
% MOTION
ORBITAL ELEMENTS
ORBITAL MECHANICS
ORBITALS
% PATHS
PERIGEEES
PERIHELIONS
QUADRATURES
ROCHE LIMIT
SATELLITE GROUND TRACKS
SCHWARZSCHILD METRIC
SPACE FLIGHT
SPACE NAVIGATION
SPACECRAFT GUIDANCE
STATIONKEEPING
SUBORBITAL FLIGHT
THREE BODY PROBLEM
TRAJECTORIES
TWO BODY PROBLEM

RT
  ORCHARDS
  O409
  RT
    AGRICULTURE
    BLIGHT
    CITRUS TREES
    CROP GROWTH
    CROP VIGOR

```



...ASPARTIC ACID  
 ...CITRIC ACID  
 ...DICARBOXYLIC ACIDS  
 ...FATTY ACIDS  
 ...ACETIC ACID  
 ...ETHYLENEDIAMINETETRAACETIC  
 ACIDS  
 ......IODOACETIC ACID  
 ......ACETYSALICYLIC ACID  
 ...BENZILIC ACID  
 ...BENZOIC ACID  
 ...LIPIC ACID  
 ...OLEIC ACID  
 ...PALMITIC ACID  
 ...PROPIONIC ACID  
 ...SEBACIC ACID  
 ...VALERIC ACID  
 ...FOLIC ACID  
 ...FORMYDROXAMIC ACID  
 ...FORMIC ACID  
 ...HEXOGENES (TRADEMARK)  
 ...LACTIC ACID  
 ...LYSINE  
 ...NICOTINIC ACID  
 ...OXALIC ACID  
 ...OXAMIC ACIDS  
 ...TRYPTOPHAN  
 ...CHOLINE  
 ...COENZYMES  
 ...ADENOSINE DIPHOSPHATE  
 ...ADENOSINE TRIPHOSPHATE  
 ...CYCLIC AMP  
 ...GLUTATHIONE  
 ...THIAMINE  
 ...CYCLIC COMPOUNDS  
 ...CYCLIC HYDROCARBONS  
 ...ANTHRACENE  
 ...BENZENE  
 ...CHLOROBENZENES  
 ...COLCHICINE  
 ...CYCLOBUTANE  
 ...CYCLOHEXANE  
 ...CYCLOPROPANE  
 ...DURENE  
 ...INDENE  
 ...MENTHOL  
 ...NAPHTHALENE  
 ...NAPHTHENES  
 ...HETEROCYCLIC COMPOUNDS  
 ...ACRIFLAVINE  
 ...ADENOSINES  
 ...ADENOSINE DIPHOSPHATE  
 ...ADENOSINE TRIPHOSPHATE  
 ...CYCLIC AMP  
 ...ALKALOIDS

...ATROPINE  
 ...BETAINES  
 ...CAFFEINE  
 ...COLCHICINE  
 ...ERGOTAMINE  
 ...HYOSCINE  
 ...LYSERGINE  
 ...MORPHINE  
 ...NICOTINAMIDE  
 ...NICOTINE  
 ...PILOCARPINE  
 ...RESERPINE  
 ...STRYCHNINE  
 ...TROPYL COMPOUNDS  
 ...ANISOLE  
 ...ASCORBIC ACID  
 ...AZINES  
 ...CYANURATES  
 ...CYANURIC ACID  
 ...MECLIZINE  
 ...METHYLENE BLUE  
 ...PHENOTHIAZINES  
 ...AZOLES  
 ...ACETAZOLAMIDE  
 ...OXAZOLE  
 ...PYRROLES  
 ...CARBAZOLES  
 ...INDOLES  
 ...TRYPTOPHAN  
 ...AZULENE  
 ...BIOTIN  
 ...CARNITINE  
 ...CYANOCOBALAMIN  
 ...CYTIDYLIC ACID  
 ...DIMENHYDRINATE  
 ...ENDRIN  
 ...ETHYLENE OXIDE  
 ...FOLIC ACID  
 ...FURANS  
 ...TETRAHYDROFURAN  
 ...GUANETHIDINE  
 ...HMX  
 ...NICOTINIC ACID  
 ...PHTHALOCYANIN  
 ...PHYLLQUINONE  
 ...PIPERIDINE  
 ...PROMETHAZINE  
 ...PURINES  
 ...ADENINES  
 ...XANTHINES  
 ...CAFFEINE  
 ...GUANINES  
 ...URIC ACID  
 ...PYRIDINES

...PYRIDOXINE  
 ...PYRIMIDINES  
 ...ALLOXAN  
 ...THYMIDINE  
 ...THYMINE  
 ...URACIL  
 ...RDX  
 ...RETINENE  
 ...RIBOFLAVIN  
 ...TETRACYCLINES  
 ...TETRAZOLES  
 ...THIAMINE  
 ...THIAZINE (TRADEMARK)  
 ...TOCOPHEROL  
 ...RHODAMINE  
 ...DIETHYL COMPOUNDS  
 ...DIETHYL ETHER  
 ...DIETHYL HYDROGEN PHOSPHITE (DEHP)  
 ...DIMETHYL COMPOUNDS  
 ...DIMETHYLHYDRAZINES  
 ...FLUORINE ORGANIC COMPOUNDS  
 ...FLUROAMINES  
 ...NITROFLUORAMINES  
 ...TRIFLUOROAMINE OXIDE  
 ...FLUROCARBONS  
 ...FLUROHYDROCARBONS  
 ...CARBON TETRAFLUORIDE  
 ...CHLOROFLUOROMETHANE  
 ...FLUROPOLYMERS  
 ...POLYVINYL FLUORIDE  
 ...KEL-F  
 ...PERFLUROALKANE  
 ...PERFLUROGUANIDINE  
 ...HYDROCARBONS  
 ...ALIPHATIC HYDROCARBONS  
 ...ALKANES  
 ...BUTANES  
 ...CETANE  
 ...ETHANE  
 ...HEPTANES  
 ...METHANE  
 ...NITROPROPANE  
 ...NONANES  
 ...OCTANES  
 ...PARAFFINS  
 ...CERESIN  
 ...PENTANES  
 ...NEOPENTANE  
 ...PROPANE  
 ...ALKENES  
 ...BUTENES  
 ...ETHYLENE  
 ...VINYLIDENE  
 ...HEXENES

# NASA THESAURUS HIERARCHICAL UPDATE

....PROPYLENE  
 ....TRIENES  
 ....ALKYNES  
 ....ACETYLENE  
 ....OXYACETYLENE  
 ....DIENES  
 ....BUTADIENE  
 ....HEPTADIENE  
 ....HEXADIENE  
 ....POLYBUTADIENE  
 ....CAROTENE  
 ...CHLOROFLUOROMETHANE  
 ...CUBANE  
 ...CYANOACETYLENE  
 ...CYCLIC HYDROCARBONS  
 ...ANTHRACENE  
 ...BENZENE  
 ...CHLOROBENZENES  
 ...COLCHICINE  
 ...CYCLOBUTANE  
 ...CYCLOHEXANE  
 ...CYCLOPROPANE  
 ...DURENE  
 ...INDENE  
 ...MENTHOL  
 ...NAPHTHALENE  
 ...NAPHTHENES  
 ...DIPHENYL COMPOUNDS  
 ...DIPHENYL HYDANTOIN  
 ...LIQUEFIED NATURAL GAS  
 ...MESITYLENE  
 ...METHYLENE  
 ...METHYLIDYNE  
 ...NATURAL GAS  
 ...PHENANTHRENE  
 ...PYRENES  
 ...QUINOXALINES  
 ...STILBENE  
 ...TOLUENE  
 ...TRIPHENYLS  
 ...XYLENE  
 ...KEROGEN  
 ...LEAD ORGANIC COMPOUNDS  
 ...LEAD ACETATES  
 ...LIPIDS  
 ...CALCIFEROL  
 ...CASTOR OIL  
 ...FATS  
 ...LIPOPROTEINS  
 ...PHYLOQUINONE  
 ...RETINENE  
 ...STEROIDS  
 ...CHOLESTEROL  
 ...CORTICOSTEROIDS  
 ....ALDOSTERONE

....HYDROCORTICOSTEROID  
 ....CORTISONE  
 ...ESTROGENS  
 ...PROSTAGLANDINS  
 ...TOCOPHEROL  
 .NUCLEIC ACIDS  
 ..DEOXYRIBONUCLEIC ACID  
 ..RIBONUCLEIC ACIDS  
 .NUCLEOTIDES  
 ..ADENINES  
 ..ADENOSINES  
 ...ADENOSINE DIPHOSPHATE  
 ...ADENOSINE TRIPHOSPHATE  
 ...CYCLIC AMP  
 ...POLYNUCLEOTIDES  
 ..PYRIDINE NUCLEOTIDES  
 ..URIDYLIC ACID  
 .ORGANIC BORON COMPOUNDS  
 .ORGANIC CHARGE TRANSFER SALTS  
 .ORGANIC GERMANIUM COMPOUNDS  
 .ORGANIC LIQUIDS  
 .ORGANIC LITHIUM COMPOUNDS  
 .ORGANIC PEROXIDES  
 .ORGANIC PHOSPHORUS COMPOUNDS  
 ..PHOSPHAZENE  
 ..PHOSPHENE  
 ..PHOSPHONITRILES  
 ..URIDYLIC ACID  
 .ORGANIC SILICON COMPOUNDS  
 ..TRIPHENYL SILICON  
 .ORGANIC SULFUR COMPOUNDS  
 .ORGANIC TIN COMPOUNDS  
 .PENTANONE  
 .PEPTIDES  
 ..POLYPEPTIDES  
 ...GLUTATHIONE  
 ...HYPERTENSIN  
 .POLYNUCLEAR ORGANIC COMPOUNDS  
 .PROPARGYL GROUPS  
 .PROTEINS  
 ..ALBUMINS  
 ..ASPARTATES  
 ..CALMODULIN  
 ..ELASTIN  
 ..ENZYMES  
 ...ALDOLASE  
 ...AMIDASE  
 ...CARBONIC ANHYDRASE  
 ...CATALASE  
 ...CHOLINESTERASE  
 ...CYTOCHROMES  
 ...HEXOKINASE  
 ...LYSOZYME  
 ...NUCLEASE  
 ...OXIDASE

...PAPAIN  
 ...PEPSIN  
 ...PROTEASE  
 ...THROMBIN  
 ...TRYPSIN  
 ..FIBRIN  
 ..GLOBULINS  
 ...FIBRINOGEN  
 ...GAMMA GLOBULIN  
 ..HEMOGLOBIN  
 ...CARBOXYHEMOGLOBIN  
 ...OXYHEMOGLOBIN  
 ...KERATINS  
 ..LIPOPROTEINS  
 ...MELANIN  
 ...MYOGLOBIN  
 ...PROTEINIDS  
 ..PROTHROMBIN  
 ..PROTOPROTEINS  
 .QUINOLINE  
 .QUINONES  
 .SEROTONIN  
 .ALCOHOLS  
 ALDEHYDES  
 % ALIPHATIC COMPOUNDS  
 ALKYL COMPOUNDS  
 % AROMATIC COMPOUNDS  
 % CHEMICAL COMPOUNDS  
 CHEMICAL EVOLUTION  
 ESTERS  
 ETHERS  
 HYDROXYL COMPOUNDS  
 METABOLITES  
 METHOXY SYSTEMS  
 METHYL COMPOUNDS  
 NITROSO COMPOUNDS  
 ORGANIC SUPERCONDUCTORS  
 ORGANIC WASTES (FUEL CONVERSION)  
 ORGANOMETALLIC COMPOUNDS  
 % SALTS

ORGANIC COOLANTS

1803 1808

GS COOLANTS

#ORGANIC COOLANTS

ORGANIC COOLED REACTORS

1808 2202 2203 2204

UF ORGEL REACTOR

GS NUCLEAR REACTORS

.LIQUID COOLED REACTORS

.#ORGANIC COOLED REACTORS

...EXPERIMENTAL ORGANIC COOLED REACTORS

RT REACTOR DESIGN

|                                |                                        |                               |
|--------------------------------|----------------------------------------|-------------------------------|
| REACTOR TECHNOLOGY             | CORK (MATERIALS)                       | ORGANIC PHOSPHORUS COMPOUNDS  |
| ORGANIC FLUORINE COMPOUNDS     | COTTON FIBERS                          | 0603 1808                     |
| USE FLUORINE ORGANIC COMPOUNDS | ELASTOMERS                             | GS                            |
|                                | LINEN                                  | ORGANIC COMPOUNDS             |
|                                | % MATERIALS                            | #ORGANIC PHOSPHORUS COMPOUNDS |
| ORGANIC GERMANIUM COMPOUNDS    | MOLDS                                  | ..PHOSPHAZENE                 |
| 1808 1704                      | PAPER (MATERIAL)                       | ..PHOSPHENE                   |
| GS                             | PHASE CHANGE MATERIALS                 | ..PHOSPHONITRILES             |
| #GERMANIUM COMPOUNDS           | PLASTICS                               | ..URIDYLIC ACID               |
| ORGANIC COMPOUNDS              | % POLYMERS                             | PHOSPHORUS COMPOUNDS          |
| #ORGANIC GERMANIUM COMPOUNDS   | ROSIN                                  | #ORGANIC PHOSPHORUS COMPOUNDS |
| ORGANOMETALLIC COMPOUNDS       | RUBBER                                 | ..PHOSPHAZENE                 |
| #ORGANIC GERMANIUM COMPOUNDS   | SILK                                   | ..PHOSPHENE                   |
| RT % CHEMICAL COMPOUNDS        | THERMOCHROMATIC MATERIALS              | ..PHOSPHONITRILES             |
| % METAL COMPOUNDS              | WOOD                                   | ..URIDYLIC ACID               |
|                                | WOOL                                   | RT % CHEMICAL COMPOUNDS       |
|                                |                                        |                               |
| ORGANIC LASERS                 | ORGANIC MODERATED REACTORS             | ORGANIC SEMICONDUCTORS        |
| 1601 1808                      | 1808 2202 2203 2204                    | 0603 1808 2602                |
| GS                             | GS                                     | GS                            |
| STIMULATED EMISSION DEVICES    | NUCLEAR REACTORS                       | SEMICONDUCTORS (MATERIALS)    |
| .LASERS                        | #ORGANIC MODERATED REACTORS            | #ORGANIC SEMICONDUCTORS       |
| ..#ORGANIC LASERS              | ..EXPERIMENTAL ORGANIC COOLED REACTORS | RT % CHEMICAL COMPOUNDS       |
| ...DYE LASERS                  |                                        | CONDUCTING POLYMERS           |
| CARBON DIOXIDE LASERS          |                                        | CONDUCTORS                    |
| CARBON LASERS                  |                                        | ORGANIC SUPERCONDUCTORS       |
| CHEMICAL LASERS                |                                        | SEMICONDUCTOR DEVICES         |
| GAS LASERS                     | ORGANIC NITRATES                       |                               |
| INFRARED LASERS                | 0603 1808                              |                               |
| LIQUID LASERS                  | GS                                     | ORGANIC SILICON COMPOUNDS     |
|                                | ESTERS                                 | 0603 1808                     |
|                                | #ORGANIC NITRATES                      | GS                            |
|                                | ..CELLULOSE NITRATE                    | ORGANIC COMPOUNDS             |
|                                | ..NITROFORMS                           | #ORGANIC SILICON COMPOUNDS    |
|                                | ...HYDRAZINE NITROFORM                 | ..TRIPHENYL SILICON           |
|                                | ..NITROGLYCERIN                        | SILICON COMPOUNDS             |
|                                | ..PETN                                 | #ORGANIC SILICON COMPOUNDS    |
|                                | NITROGEN COMPOUNDS                     | ..TRIPHENYL SILICON           |
|                                | .NITRATES                              | RT % CHEMICAL COMPOUNDS       |
|                                | ..#ORGANIC NITRATES                    |                               |
|                                | ...CELLULOSE NITRATE                   | ORGANIC SOLIDS                |
|                                | ...NITROFORMS                          | 0603                          |
|                                | ...HYDRAZINE NITROFORM                 | RT                            |
|                                | ...NITROGLYCERIN                       | ASTRONOMICAL SPECTROSCOPY     |
|                                | ...PETN                                | COSMIC DUST                   |
|                                |                                        | PLANETARY ATMOSPHERES         |
|                                |                                        | SOLIDS                        |
|                                |                                        |                               |
| ORGANIC LIQUIDS                | ORGANIC PEROXIDES                      | ORGANIC SULFUR COMPOUNDS      |
| 0603 1808                      | 0603                                   | 0603 1808                     |
| GS                             | GS                                     | GS                            |
| LIQUIDS                        | CHALCOGENIDES                          | ORGANIC COMPOUNDS             |
| #ORGANIC LIQUIDS               | .OXIDES                                | #ORGANIC SULFUR COMPOUNDS     |
| ORGANIC COMPOUNDS              | ..ANHYDRIDES                           | SULFUR COMPOUNDS              |
| #ORGANIC LIQUIDS               | ...PEROXIDES                           | #ORGANIC SULFUR COMPOUNDS     |
| RT PYRUVATES                   | ...#ORGANIC PEROXIDES                  | RT % CHEMICAL COMPOUNDS       |
| XANTHIC ACIDS                  | ORGANIC COMPOUNDS                      |                               |
|                                | #ORGANIC PEROXIDES                     |                               |
|                                | AIR POLLUTION                          | ORGANIC SUPERCONDUCTORS       |
|                                | HYDROCARBONS                           | 1002 2302 2303 2603           |
|                                | INORGANIC PEROXIDES                    | GS                            |
|                                |                                        | CONDUCTORS                    |
|                                |                                        | .SUPERCONDUCTORS              |
|                                |                                        |                               |
| ORGANIC LITHIUM COMPOUNDS      |                                        |                               |
| 1808                           |                                        |                               |
| GS                             |                                        |                               |
| LITHIUM COMPOUNDS              |                                        |                               |
| #ORGANIC LITHIUM COMPOUNDS     |                                        |                               |
| ORGANIC COMPOUNDS              |                                        |                               |
| ORGANOMETALLIC COMPOUNDS       |                                        |                               |
| #ORGANIC LITHIUM COMPOUNDS     |                                        |                               |
| RT % CHEMICAL COMPOUNDS        |                                        |                               |
| % METAL COMPOUNDS              |                                        |                               |
|                                |                                        |                               |
| ORGANIC MATERIALS              |                                        |                               |
| 1808 0603 1805 1809 1810 1811  |                                        |                               |
| GS                             |                                        |                               |
| #ORGANIC MATERIALS             |                                        |                               |
| .PEAT                          |                                        |                               |
| RT BIODEGRADABILITY            |                                        |                               |
| CARBONACEOUS MATERIALS         |                                        |                               |



# NASA THESAURUS HIERARCHICAL UPDATE

RT .#ORGANIC SUPERCONDUCTORS  
 ORGANIC CHARGE TRANSFER SALTS  
 ORGANIC COMPOUNDS  
 ORGANIC SEMICONDUCTORS

ORGANIC TIN COMPOUNDS  
 1808  
 GS ORGANIC COMPOUNDS  
 #ORGANIC TIN COMPOUNDS  
 ORGANOMETALLIC COMPOUNDS  
 #ORGANIC TIN COMPOUNDS  
 TIN COMPOUNDS  
 #ORGANIC TIN COMPOUNDS  
 % CHEMICAL COMPOUNDS  
 % METAL COMPOUNDS

ORGANIC WASTES (FUEL CONVERSION)  
 0301 0403 0505 0602  
 RT % CONVERSION  
 ENERGY CONVERSION  
 GARBAGE  
 HUMAN WASTES  
 METABOLIC WASTES  
 ORGANIC COMPOUNDS  
 RESIDUES  
 SEWAGE  
 SLUDGE  
 WASTES

ORGANISMS  
 0402 0404 0409  
 RT ANIMALS  
 BIOMASS  
 CARBON CYCLE  
 DEEP SCATTERING LAYERS  
 PLANTS (BOTANY)

ORGANIZATIONS  
 3403  
 UF ASSOCIATIONS  
 GS #ORGANIZATIONS  
 .EUROPEAN SPACE AGENCY  
 .FEDERATIONS  
 .BUREAUS (ORGANIZATIONS)  
 .ISRO  
 .NORTH ATLANTIC TREATY  
 ORGANIZATION (NATO)  
 .WORLD METEOROLOGICAL ORGANIZATION

RT TEAMS  
 UNITED NATIONS

ORGANIZING  
 3401 3402 3403 3406  
 RT PERSONNEL  
 UNIONIZATION

ORGANOMETALLIC COMPOUNDS  
 1703 1808  
 UF METALLOGANIC COMPOUNDS  
 GS #ORGANOMETALLIC COMPOUNDS  
 .CHLOROPHYLLS  
 .FERROCENES  
 .ALKYLFERROCENE  
 .HEMOGLOBIN  
 .CARBOXYHEMOGLOBIN  
 .OXYHEMOGLOBIN  
 .METALLOXANE POLYMER  
 .ORGANIC ALUMINUM COMPOUNDS  
 .ORGANIC GERMANIUM COMPOUNDS  
 .ORGANIC LITHIUM COMPOUNDS  
 .ORGANIC TIN COMPOUNDS  
 .PORPHINES  
 .CHELATES  
 % CHEMICAL COMPOUNDS  
 % METAL COMPOUNDS  
 METALLOIDS  
 METALLOSILOXANE POLYMER  
 METALORGANIC CHEMICAL VAPOR  
 DEPOSITION  
 ORGANIC COMPOUNDS  
 SYNTHETIC METALS  
 TETRABUTYLS

RT  
 % ORIENTATION  
 0408 0502  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ALIGNMENT  
 ATTITUDE (INCLINATION)  
 AZIMUTH  
 BEARING (DIRECTION)  
 BRAGG ANGLE  
 COLLIMATION  
 CRYSTALLOGRAPHY  
 DIRECTIVITY  
 EDUCATION  
 FIBER ORIENTATION  
 FIELD STRENGTH  
 HORIZONTAL ORIENTATION  
 INSTRUMENT ORIENTATION  
 ISOTROPY  
 OPTICAL PROPERTIES  
 ORBITAL POSITION ESTIMATION  
 PLY ORIENTATION  
 POLARIZATION (SPIN ALIGNMENT)  
 POLARIZATION (WAVES)  
 POSITION (LOCATION)  
 POSITIONING  
 SOUND LOCALIZATION  
 VERTICAL ORIENTATION  
 VERTICAL PERCEPTION  
 VISUAL PERCEPTION

ORGANOMETALLIC POLYMERS  
 1704 1808 1810  
 RT POLYCARBOSILANES  
 % POLYMERS  
 POLYSILANES

ORGANOMETALLIC VAPOR DEPOSITION  
 USE METALORGANIC CHEMICAL VAPOR  
 DEPOSITION

ORGANS  
 0401 0404 0405  
 SN (FOR SPECIFIC ORGANS, ORGAN  
 SUBSTRUCTURES AND ORGAN SYSTEMS  
 SEE ANATOMY)  
 GS #ORGANS  
 .VISCERA  
 ANATOMY  
 CELLS (BIOLOGY)  
 CIRCULATORY SYSTEM  
 DIGESTIVE SYSTEM  
 GASTROINTESTINAL SYSTEM  
 GENITOURINARY SYSTEM  
 GLANDS (ANATOMY)  
 RESPIRATORY SYSTEM  
 SENSE ORGANS  
 TISSUES (BIOLOGY)

ORIFICE FLOW  
 1202 1203 1204  
 GS FLUID FLOW  
 #ORIFICE FLOW  
 RT CHOKED FLOW

```

CRITICAL FLOW
% FLOW
  GAS FLOW
  GRAZING FLOW
  LAMINAR FLOW
  LIQUID FLOW
  MULTIPHASE FLOW
  ORIFICES
  PIPE FLOW
  PRESSURE GRADIENTS
  SINGLE-PHASE FLOW
  STEADY FLOW
  STEAM FLOW
  SUBCRITICAL FLOW
  SUPERCRITICAL FLOW
  TURBULENT FLOW
  UNSTEADY FLOW

ORIFICES
O101 O404 1201 1202 1305 1504 2806
RT ANNUAL DUCTS
  APERTURES
  CAVITIES
  CHOKES (FUEL SYSTEMS)
  CHOKES (RESTRICTIONS)
  DUCTS
  FLOW MEASUREMENT
  FLOWMETERS
  GAPS
  INJECTORS
  NOZZLES
  OPENINGS
  OPERATIONS
  ORIFICE FLOW
  PORTS (OPENINGS)
  SPRAY NOZZLES
  THROATS
  VENTURI TUBES

ORIGIN OF PLASMAS IN EARTH NEIGHBORHOOD
USE OPEN PROJECT

% ORIGINS
O404 1902
SN (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
RT CAUSES
  COORDINATES
  DERIVATION
  GRAPHS (CHARTS)

ORION (RADIO INTERFEROMETRY NETWORK)
1405
RT RADIO INTERFEROMETERS

RADIO RECEIVERS
TRACKING NETWORKS

ORION AIRCRAFT
USE P-3 AIRCRAFT

ORION CONSTELLATION
3001 3009
GS CONSTELLATIONS
  #ORION CONSTELLATION
RT OPIK THEORY
  ORION NEBULA
  SIGMA ORIONIS

ORION NEBULA
3001
GS CELESTIAL BODIES
  .NEBULAE
  .#ORION NEBULA
  HYDROGEN CLOUDS
  #ORION NEBULA
RT ASTROPHYSICS
  CASSIOPEIA A
  CRAB NEBULA
  GALAXIES
  GUM NEBULA
  INTERSTELLAR GAS
  INTERSTELLAR MATTER
  IRREGULAR GALAXIES
  MAGELLANIC CLOUDS
  MILKY WAY GALAXY
  OPIK THEORY
  ORION CONSTELLATION
  PLANETARY NEBULAE
  STELLAR CORONAS
  SUPERNOVAE

ORIONID METEORIODS
3001 3005
GS CELESTIAL BODIES
  .METEOROID SHOWERS
  .#ORIONID METEORIODS
  .METEORIODS
  .#ORIONID METEORIODS
RT AQUARIID METEORIODS

ORLICZ SPACE
1902
RT SET THEORY

ORNITHOPTER AIRCRAFT
USE RESEARCH AIRCRAFT

ORNSTEIN-UHLENBECK PROCESS
2307 2401 2405

CRITICAL FLOW
% FLOW
  GAS FLOW
  GRAZING FLOW
  LAMINAR FLOW
  LIQUID FLOW
  MULTIPHASE FLOW
  ORIFICES
  PIPE FLOW
  PRESSURE GRADIENTS
  SINGLE-PHASE FLOW
  STEADY FLOW
  STEAM FLOW
  SUBCRITICAL FLOW
  SUPERCRITICAL FLOW
  TURBULENT FLOW
  UNSTEADY FLOW

ORIFICES
O101 O404 1201 1202 1305 1504 2806
RT ANNUAL DUCTS
  APERTURES
  CAVITIES
  CHOKES (FUEL SYSTEMS)
  CHOKES (RESTRICTIONS)
  DUCTS
  FLOW MEASUREMENT
  FLOWMETERS
  GAPS
  INJECTORS
  NOZZLES
  OPENINGS
  OPERATIONS
  ORIFICE FLOW
  PORTS (OPENINGS)
  SPRAY NOZZLES
  THROATS
  VENTURI TUBES

ORIGIN OF PLASMAS IN EARTH NEIGHBORHOOD
USE OPEN PROJECT

% ORIGINS
O404 1902
SN (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
RT CAUSES
  COORDINATES
  DERIVATION
  GRAPHS (CHARTS)

ORION (RADIO INTERFEROMETRY NETWORK)
1405
RT RADIO INTERFEROMETERS

RADIO RECEIVERS
TRACKING NETWORKS

ORION AIRCRAFT
USE P-3 AIRCRAFT

ORION CONSTELLATION
3001 3009
GS CONSTELLATIONS
  #ORION CONSTELLATION
RT OPIK THEORY
  ORION NEBULA
  SIGMA ORIONIS

ORION NEBULA
3001
GS CELESTIAL BODIES
  .NEBULAE
  .#ORION NEBULA
  HYDROGEN CLOUDS
  #ORION NEBULA
RT ASTROPHYSICS
  CASSIOPEIA A
  CRAB NEBULA
  GALAXIES
  GUM NEBULA
  INTERSTELLAR GAS
  INTERSTELLAR MATTER
  IRREGULAR GALAXIES
  MAGELLANIC CLOUDS
  MILKY WAY GALAXY
  OPIK THEORY
  ORION CONSTELLATION
  PLANETARY NEBULAE
  STELLAR CORONAS
  SUPERNOVAE

ORIONID METEORIODS
3001 3005
GS CELESTIAL BODIES
  .METEOROID SHOWERS
  .#ORIONID METEORIODS
  .METEORIODS
  .#ORIONID METEORIODS
RT AQUARIID METEORIODS

ORLICZ SPACE
1902
RT SET THEORY

ORNITHOPTER AIRCRAFT
USE RESEARCH AIRCRAFT

ORNSTEIN-UHLENBECK PROCESS
2307 2401 2405

OROGRAPHIC CLOUDS
USE CAP CLOUDS

OROGRAPHY
1304 1305 1308 1306
GS GEOGRAPHY
  #OROGRAPHY
  GEOLOGY
  #OROGRAPHY
  CONES (VOLCANOES)
  GEOMORPHOLOGY
  ISOSTASY
  MARS VOLCANOES
  MOUNTAINS
  PEAKS (LANDFORMS)
  VOLCANOES
  VOLCANOLOGY

ORR-SOMMERFELD EQUATIONS
1202 1203
RT % EQUATIONS
  FLOW DISTORTION
  FLOW STABILITY
  FLOW THEORY
  QUANTUM MECHANICS
  VELOCITY DISTRIBUTION

ORRERIES
USE ASTRONOMICAL MODELS

ORTHICONS
O701 O702 O905
GS ELECTRON TUBES
  .CAMERA TUBES
  .#ORTHICONS
  ...IMAGE ORTHICONS
RT IMAGE INTENSIFIERS
  PHOTOCATHODES
  TELEVISION CAMERAS
  TELEVISION EQUIPMENT

ORTHO HYDROGEN
O603
GS GASES
  #ORTHO HYDROGEN
RT HYDROGEN

ORTHO PARA CONVERSION
O403 O602 O603
GS ISOMERIZATION
  #ORTHO PARA CONVERSION
RT % CONVERSION
  PARA HYDROGEN

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ORTHOGONAL FUNCTIONS<br>1902<br>GS<br>ANALYSIS (MATHEMATICS)<br>.COMPLEX VARIABLES<br>.#ORTHOGONAL FUNCTIONS<br>FUNCTIONS (MATHEMATICS)<br>#ORTHOGONAL FUNCTIONS<br>.WALSH FUNCTION<br>BESSEL FUNCTIONS<br>EXPONENTIAL FUNCTIONS<br>FUNCTION SPACE<br>HANKEL FUNCTIONS<br>HYPERBOLIC FUNCTIONS<br>LAGUERRE FUNCTIONS<br>LEGENDRE FUNCTIONS<br>LINEAR TRANSFORMATIONS<br>MATHIEU FUNCTION<br>ORTHOGONALITY<br>ORTHONORMAL FUNCTIONS<br>QUALITY CONTROL | GS<br>FUNCTIONS (MATHEMATICS)<br>#ORTHONORMAL FUNCTIONS<br>RT<br>ORTHOGONAL FUNCTIONS<br>WAVELET ANALYSIS<br><br>ORTHOPEDICS<br>O404 O405 O408<br>GS<br>MEDICAL SCIENCE<br>#ORTHOPEDICS<br><br>ORTHOPHOTOGRAPHY<br>1407 3501<br>GS<br>PHOTOGRAPHY<br>#ORTHOPHOTOGRAPHY<br>RT<br>AERIAL PHOTOGRAPHY<br>COLOR PHOTOGRAPHY<br>MAPPING<br><br>ORTHOSTATIC TOLERANCE<br>O401 O405 O408<br>RT<br>BED REST<br>BLOOD PRESSURE<br>HEAD DOWN TILT<br>HUMAN TOLERANCES<br>LOWER BODY NEGATIVE PRESSURE<br>POSTURE<br>TOLERANCES (PHYSIOLOGY) | OSCILLATING CYLINDERS<br>2308 3203<br>RT %<br>CYLINDERS<br>CYLINDRICAL BODIES<br>CYLINDRICAL SHELLS<br>OSCILLATIONS<br>VIBRATION<br><br>OSCILLATING FLOW<br>1201 1202 1203<br>GS<br>FLUID FLOW<br>.UNSTEADY FLOW<br>.#OSCILLATING FLOW<br>RT<br>BUFFETING<br>COMPRESSIBILITY EFFECTS<br>FLOW DISTORTION<br>NONEQUILIBRIUM FLOW<br>SMALL PERTURBATION FLOW<br>STROUHAL NUMBER<br><br>OSCILLATION DAMPERS<br>1504<br>RT %<br>ABSORBERS<br>%<br>DAMPERS<br>MAXWELL BODIES<br>NONOSCILLATORY ACTION<br>NONSTABILIZED OSCILLATION<br>NUTATION DAMPERS<br>SPRINGS (ELASTIC)<br>VIBRATION ISOLATORS               |
| ORTHOGONAL MULTIPLEXING THEORY<br>O702 O705 O710 1002 2402<br>RT<br>PULSE COMMUNICATION<br>SIGNAL TRANSMISSION<br>% THEORIES<br>WAVE INTERACTION<br>WAVELENGTH DIVISION MULTIPLEXING                                                                                                                                                                                                                                                                  | ORTHOTROPIC CYLINDERS<br>3203<br>RT %<br>CYLINDERS<br>CYLINDRICAL BODIES<br>CYLINDRICAL SHELLS<br>ROCKET ENGINE CASES<br><br>ORTHOTROPIC PLATES<br>3203<br>GS<br>STRUCTURAL MEMBERS<br>.PLATES (STRUCTURAL MEMBERS)<br>.#ORTHOTROPIC PLATES<br><br>ORTHOTROPIC SHELLS<br>3203<br>GS<br>SHELLS (STRUCTURAL FORMS)<br>#ORTHOTROPIC SHELLS<br>RT<br>CYLINDRICAL SHELLS<br>METAL SHELLS<br>REINFORCED SHELLS<br>SHELL STABILITY<br>THIN WALLED SHELLS<br><br>ORTHOTROPISM<br>O409 3408<br>RT<br>PLATES (STRUCTURAL MEMBERS)           | OSCILLATIONS<br>O503 O905 1003 2301 2402 3204<br>UF<br>PHUGOID OSCILLATIONS<br>GS<br>#OSCILLATIONS<br>.AIRFOIL OSCILLATIONS<br>.WING OSCILLATIONS<br>.ELECTRON OSCILLATIONS<br>.HARMONIC OSCILLATION<br>.HYDROFOIL OSCILLATIONS<br>.MOLECULAR OSCILLATIONS<br>.NONOSCILLATORY ACTION<br>.NONSTABILIZED OSCILLATION<br>.PLASMA OSCILLATIONS<br>.PRESSURE OSCILLATIONS<br>.SELF OSCILLATION<br>.SOUTHERN OSCILLATION<br>.STABLE OSCILLATIONS<br>.STELLAR OSCILLATIONS<br>.SOLAR OSCILLATIONS<br>.TRANSIENT OSCILLATIONS<br>.TRANSVERSE OSCILLATION<br>.H WAVES<br>.UNDAMPED OSCILLATIONS<br>RT<br>AMPLITUDES |
| ORTHOGONALITY<br>1902 4001<br>UF<br>KRONECKER PRODUCT<br>GS<br>MOMENTS<br>.DISTRIBUTION MOMENTS<br>.#ORTHOGONALITY<br>COVARIANCE<br>EXPERIMENT DESIGN<br>FACTOR ANALYSIS<br>ORTHOGONAL FUNCTIONS<br>QUALITY CONTROL                                                                                                                                                                                                                                   | ORTHOTROPIC PLATES<br>3203<br>GS<br>STRUCTURAL MEMBERS<br>.PLATES (STRUCTURAL MEMBERS)<br>.#ORTHOTROPIC PLATES<br><br>ORTHOTROPIC SHELLS<br>3203<br>GS<br>SHELLS (STRUCTURAL FORMS)<br>#ORTHOTROPIC SHELLS<br>RT<br>CYLINDRICAL SHELLS<br>METAL SHELLS<br>REINFORCED SHELLS<br>SHELL STABILITY<br>THIN WALLED SHELLS<br><br>ORTHOTROPISM<br>O409 3408<br>RT<br>PLATES (STRUCTURAL MEMBERS)                                                                                                                                        | OSCILLATIONS<br>O503 O905 1003 2301 2402 3204<br>UF<br>PHUGOID OSCILLATIONS<br>GS<br>#OSCILLATIONS<br>.AIRFOIL OSCILLATIONS<br>.WING OSCILLATIONS<br>.ELECTRON OSCILLATIONS<br>.HARMONIC OSCILLATION<br>.HYDROFOIL OSCILLATIONS<br>.MOLECULAR OSCILLATIONS<br>.NONOSCILLATORY ACTION<br>.NONSTABILIZED OSCILLATION<br>.PLASMA OSCILLATIONS<br>.PRESSURE OSCILLATIONS<br>.SELF OSCILLATION<br>.SOUTHERN OSCILLATION<br>.STABLE OSCILLATIONS<br>.STELLAR OSCILLATIONS<br>.SOLAR OSCILLATIONS<br>.TRANSIENT OSCILLATIONS<br>.TRANSVERSE OSCILLATION<br>.H WAVES<br>.UNDAMPED OSCILLATIONS<br>RT<br>AMPLITUDES |
| ORTHOGONALITY<br>1902 4001<br>UF<br>KRONECKER PRODUCT<br>GS<br>MOMENTS<br>.DISTRIBUTION MOMENTS<br>.#ORTHOGONALITY<br>COVARIANCE<br>EXPERIMENT DESIGN<br>FACTOR ANALYSIS<br>ORTHOGONAL FUNCTIONS<br>QUALITY CONTROL                                                                                                                                                                                                                                   | ORTHOTROPIC PLATES<br>3203<br>GS<br>STRUCTURAL MEMBERS<br>.PLATES (STRUCTURAL MEMBERS)<br>.#ORTHOTROPIC PLATES<br><br>ORTHOTROPIC SHELLS<br>3203<br>GS<br>SHELLS (STRUCTURAL FORMS)<br>#ORTHOTROPIC SHELLS<br>RT<br>CYLINDRICAL SHELLS<br>METAL SHELLS<br>REINFORCED SHELLS<br>SHELL STABILITY<br>THIN WALLED SHELLS<br><br>ORTHOTROPISM<br>O409 3408<br>RT<br>PLATES (STRUCTURAL MEMBERS)                                                                                                                                        | OSCILLATIONS<br>O503 O905 1003 2301 2402 3204<br>UF<br>PHUGOID OSCILLATIONS<br>GS<br>#OSCILLATIONS<br>.AIRFOIL OSCILLATIONS<br>.WING OSCILLATIONS<br>.ELECTRON OSCILLATIONS<br>.HARMONIC OSCILLATION<br>.HYDROFOIL OSCILLATIONS<br>.MOLECULAR OSCILLATIONS<br>.NONOSCILLATORY ACTION<br>.NONSTABILIZED OSCILLATION<br>.PLASMA OSCILLATIONS<br>.PRESSURE OSCILLATIONS<br>.SELF OSCILLATION<br>.SOUTHERN OSCILLATION<br>.STABLE OSCILLATIONS<br>.STELLAR OSCILLATIONS<br>.SOLAR OSCILLATIONS<br>.TRANSIENT OSCILLATIONS<br>.TRANSVERSE OSCILLATION<br>.H WAVES<br>.UNDAMPED OSCILLATIONS<br>RT<br>AMPLITUDES |
| ORTHOGONALITY<br>1902 4001<br>UF<br>KRONECKER PRODUCT<br>GS<br>MOMENTS<br>.DISTRIBUTION MOMENTS<br>.#ORTHOGONALITY<br>COVARIANCE<br>EXPERIMENT DESIGN<br>FACTOR ANALYSIS<br>ORTHOGONAL FUNCTIONS<br>QUALITY CONTROL                                                                                                                                                                                                                                   | ORTHOTROPIC PLATES<br>3203<br>GS<br>STRUCTURAL MEMBERS<br>.PLATES (STRUCTURAL MEMBERS)<br>.#ORTHOTROPIC PLATES<br><br>ORTHOTROPIC SHELLS<br>3203<br>GS<br>SHELLS (STRUCTURAL FORMS)<br>#ORTHOTROPIC SHELLS<br>RT<br>CYLINDRICAL SHELLS<br>METAL SHELLS<br>REINFORCED SHELLS<br>SHELL STABILITY<br>THIN WALLED SHELLS<br><br>ORTHOTROPISM<br>O409 3408<br>RT<br>PLATES (STRUCTURAL MEMBERS)                                                                                                                                        | OSCILLATIONS<br>O503 O905 1003 2301 2402 3204<br>UF<br>PHUGOID OSCILLATIONS<br>GS<br>#OSCILLATIONS<br>.AIRFOIL OSCILLATIONS<br>.WING OSCILLATIONS<br>.ELECTRON OSCILLATIONS<br>.HARMONIC OSCILLATION<br>.HYDROFOIL OSCILLATIONS<br>.MOLECULAR OSCILLATIONS<br>.NONOSCILLATORY ACTION<br>.NONSTABILIZED OSCILLATION<br>.PLASMA OSCILLATIONS<br>.PRESSURE OSCILLATIONS<br>.SELF OSCILLATION<br>.SOUTHERN OSCILLATION<br>.STABLE OSCILLATIONS<br>.STELLAR OSCILLATIONS<br>.SOLAR OSCILLATIONS<br>.TRANSIENT OSCILLATIONS<br>.TRANSVERSE OSCILLATION<br>.H WAVES<br>.UNDAMPED OSCILLATIONS<br>RT<br>AMPLITUDES |

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BRUNT-VAISALA FREQUENCY
CRYSTAL OSCILLATORS
DAMPING
FEEDBACK
% MOTION
NONUNIFORMITY
ORBITAL RESONANCES (CELESTIAL
MECHANICS)
OSCILLATING CYLINDERS
OSCILLATORS
PENDULUMS
PERIODIC VARIATIONS
PERTURBATION
RESONANCE
RESONANT VIBRATION
% RHYTHM
SPACECRAFT MOTION
SPRINGS (ELASTIC)
SYNTONY
TRAVELING WAVE TUBES
VIBRATION
VIBRATION TESTS

OSCILLATOR STRENGTHS
2401
RT
  ABSORPTION SPECTRA
  ABSORPTIVITY
  ELECTRON OSCILLATIONS
  ELECTRON TRANSITIONS
  LINE SPECTRA
  MOLECULAR OSCILLATIONS
  MOLECULAR OSCILLATORS
  OSCILLATORS
  SPECTRAL LINE WIDTH

OSCILLATORS
0904 1201
UF WAVE OSCILLATORS
GS #OSCILLATORS
  .AUTODYNES
  .CRYSTAL OSCILLATORS
  .PIEZOELECTRIC CRYSTALS
  .HARMONIC OSCILLATORS
  .MECHANICAL OSCILLATORS
  .PENDULUMS
  .GYROSCOPIC PENDULUMS
  .MICROWAVE OSCILLATORS
  .MAGNETRONS
  .NIGOTRONS
  .MOLECULAR OSCILLATORS
  .RELAXATION OSCILLATORS
  .PHANTASTRONS
  .SYNCHRONIZED OSCILLATORS
  .VACUUM TUBE OSCILLATORS
  .VOLTAGE CONTROLLED OSCILLATORS

RT
  AMPLIFIERS
  AUTOMATIC FREQUENCY CONTROL
  CAVITY RESONATORS
  CIRCUITS
  ELECTRON TUBES
  FEEDBACK
  FEEDBACK AMPLIFIERS
  FLIP-FLOPS
  FREQUENCY PULLING
  FREQUENCY STABILITY
  FREQUENCY SYNTHESIZERS
  HARMONIC GENERATORS
  INVERTERS
  MICROWAVE TUBES
  % MOTION
  MULTIVIBRATORS
  NEGATIVE FEEDBACK
  NONOSCILLATORY ACTION
  NONSTABILIZED OSCILLATION
  OSCILLATIONS
  OSCILLATOR STRENGTHS
  PARAMETRONS
  PERIODIC VARIATIONS
  PERTURBATION
  POSITIVE FEEDBACK
  RESONANT FREQUENCIES
  RESONATORS
  SELF EXCITATION
  SEMICONDUCTOR DEVICES
  SIGNAL GENERATORS
  SOLID STATE DEVICES
  SUBHARMONIC GENERATORS
  SUPERCONDUCTING CAVITY RESONATORS
  TRANSFORMERS
  VIBRATION

OSCILLOGRAMS
  USE OSCILLOGRAMS

OSCILLOGRAPHS
0905 2402
UF OSCILLOGRAMS
GS MEASURING INSTRUMENTS
  #OSCILLOGRAPHS
  RECORDING INSTRUMENTS
  #OSCILLOGRAPHS
RT BARKHAUSEN EFFECT
  ELECTRICAL MEASUREMENT
  OSCILLOGRAPHS
  TIME MEASUREMENT

OSCILLOGRAPHS
0905 2402
RT CATHODE RAY TUBES
  ELECTRONIC EQUIPMENT TESTS

FLYING SPOT SCANNERS
FREQUENCY ANALYZERS
OSCILLOGRAPHS
SWEEP CIRCUITS
SWEEP FREQUENCY
SYNCHROSCOPES
VIDEO EQUIPMENT

OSCULATIONS
  USE DOUBLE CUSPS

OSEEN APPROXIMATION
1202 1203 1902
GS ANALYSIS (MATHEMATICS)
  .NUMERICAL ANALYSIS
  ..APPROXIMATION
  ..#OSEEN APPROXIMATION
RT INCOMPRESSIBLE FLUIDS
  NAVIER-STOKES EQUATION
  ROSHKO PREDICTION
  STOKES FLOW
  VISCOUS FLUIDS

OSMIUM
0603
GS CHEMICAL ELEMENTS
  #OSMIUM
  ..OSMIUM ISOTOPES
  METALS
  .REFRACTORY METALS
  .#OSMIUM
  ...OSMIUM ISOTOPES
  .TRANSITION METALS
  .#OSMIUM
  ...OSMIUM ISOTOPES
  REFRACTORY MATERIALS
  .REFRACTORY METALS
  .#OSMIUM
  ...OSMIUM ISOTOPES

OSMIUM ALLOYS
1701 1704
GS ALLOYS
  .HEAT RESISTANT ALLOYS
  ..REFRACTORY METAL ALLOYS
  ...#OSMIUM ALLOYS
  REFRACTORY MATERIALS
  .REFRACTORY METAL ALLOYS
  .#OSMIUM ALLOYS

OSMIUM COMPOUNDS
0603 1804
RT % CHEMICAL COMPOUNDS
  % GROUP 8 COMPOUNDS
  % METAL COMPOUNDS

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|                      |    |                            |
|----------------------|----|----------------------------|
| OSMIUM ISOTOPEs      | GS | ARTIFICIAL SATELLITES      |
| O603 1703 2406       |    | .GEOPHYSICAL SATELLITES    |
| GS                   |    | ..OSO                      |
| CHEMICAL ELEMENTS    |    | ..#OSO-C                   |
| .OSMIUM              |    | OBSERVATORIES              |
| .#OSMIUM ISOTOPEs    |    | .GEOPHYSICAL OBSERVATORIES |
| METALS               |    | ..OSO                      |
| .REFRACTORY METALS   |    | ..#OSO-C                   |
| ..OSMIUM             |    | .SOLAR OBSERVATORIES       |
| ..#OSMIUM ISOTOPEs   |    | ..OSO                      |
| .TRANSITION METALS   |    | ..#OSO-C                   |
| ..OSMIUM             |    | RT DELTA LAUNCH VEHICLE    |
| ..#OSMIUM ISOTOPEs   |    |                            |
| REFRACTORY MATERIALS |    | OSO-D                      |
| .REFRACTORY METALS   |    | USE OSO-4                  |
| ..OSMIUM             |    |                            |
| ..#OSMIUM ISOTOPEs   |    | OSO-E                      |
| USE OSO-3            |    | USE OSO-3                  |
| OSO-F                |    | USE OSO-5                  |
| OSO-G                |    | USE OSO-6                  |
| OSO-H                |    | USE OSO-7                  |
| OSO-I                |    | USE OSO-8                  |
| OSO-J                |    | USE OSO-9                  |
| OSO-K                |    | USE OSO-10                 |
| OSO-L                |    | USE OSO-11                 |
| OSO-M                |    | USE OSO-12                 |
| OSO-N                |    | USE OSO-13                 |
| OSO-O                |    | USE OSO-14                 |
| OSO-P                |    | USE OSO-15                 |
| OSO-Q                |    | USE OSO-16                 |
| OSO-R                |    | USE OSO-17                 |
| OSO-S                |    | USE OSO-18                 |
| OSO-T                |    | USE OSO-19                 |
| OSO-U                |    | USE OSO-20                 |
| OSO-V                |    | USE OSO-21                 |
| OSO-W                |    | USE OSO-22                 |
| OSO-X                |    | USE OSO-23                 |
| OSO-Y                |    | USE OSO-24                 |
| OSO-Z                |    | USE OSO-25                 |
| OSO-AA               |    | USE OSO-26                 |
| OSO-AB               |    | USE OSO-27                 |
| OSO-AC               |    | USE OSO-28                 |
| OSO-AD               |    | USE OSO-29                 |
| OSO-AE               |    | USE OSO-30                 |
| OSO-AF               |    | USE OSO-31                 |
| OSO-AG               |    | USE OSO-32                 |
| OSO-AH               |    | USE OSO-33                 |
| OSO-AI               |    | USE OSO-34                 |
| OSO-AJ               |    | USE OSO-35                 |
| OSO-AK               |    | USE OSO-36                 |
| OSO-AL               |    | USE OSO-37                 |
| OSO-AM               |    | USE OSO-38                 |
| OSO-AN               |    | USE OSO-39                 |
| OSO-AO               |    | USE OSO-40                 |
| OSO-AP               |    | USE OSO-41                 |
| OSO-AQ               |    | USE OSO-42                 |
| OSO-AR               |    | USE OSO-43                 |
| OSO-AS               |    | USE OSO-44                 |
| OSO-AT               |    | USE OSO-45                 |
| OSO-AU               |    | USE OSO-46                 |
| OSO-AV               |    | USE OSO-47                 |
| OSO-AW               |    | USE OSO-48                 |
| OSO-AX               |    | USE OSO-49                 |
| OSO-AY               |    | USE OSO-50                 |
| OSO-AZ               |    | USE OSO-51                 |
| OSO-BA               |    | USE OSO-52                 |
| OSO-BB               |    | USE OSO-53                 |
| OSO-BC               |    | USE OSO-54                 |
| OSO-BD               |    | USE OSO-55                 |
| OSO-BE               |    | USE OSO-56                 |
| OSO-BF               |    | USE OSO-57                 |
| OSO-BG               |    | USE OSO-58                 |
| OSO-BH               |    | USE OSO-59                 |
| OSO-BI               |    | USE OSO-60                 |
| OSO-BJ               |    | USE OSO-61                 |
| OSO-BK               |    | USE OSO-62                 |
| OSO-BL               |    | USE OSO-63                 |
| OSO-BM               |    | USE OSO-64                 |
| OSO-BN               |    | USE OSO-65                 |
| OSO-BO               |    | USE OSO-66                 |
| OSO-BP               |    | USE OSO-67                 |
| OSO-BQ               |    | USE OSO-68                 |
| OSO-BR               |    | USE OSO-69                 |
| OSO-BS               |    | USE OSO-70                 |
| OSO-BT               |    | USE OSO-71                 |
| OSO-BU               |    | USE OSO-72                 |
| OSO-BV               |    | USE OSO-73                 |
| OSO-BW               |    | USE OSO-74                 |
| OSO-BX               |    | USE OSO-75                 |
| OSO-By               |    | USE OSO-76                 |
| OSO-BZ               |    | USE OSO-77                 |
| OSO-CA               |    | USE OSO-78                 |
| OSO-CB               |    | USE OSO-79                 |
| OSO-CC               |    | USE OSO-80                 |
| OSO-CD               |    | USE OSO-81                 |
| OSO-CE               |    | USE OSO-82                 |
| OSO-CF               |    | USE OSO-83                 |
| OSO-CG               |    | USE OSO-84                 |
| OSO-CH               |    | USE OSO-85                 |
| OSO-CI               |    | USE OSO-86                 |
| OSO-CJ               |    | USE OSO-87                 |
| OSO-CK               |    | USE OSO-88                 |
| OSO-CL               |    | USE OSO-89                 |
| OSO-CM               |    | USE OSO-90                 |
| OSO-CN               |    | USE OSO-91                 |
| OSO-CO               |    | USE OSO-92                 |
| OSO-CP               |    | USE OSO-93                 |
| OSO-CQ               |    | USE OSO-94                 |
| OSO-CR               |    | USE OSO-95                 |
| OSO-CS               |    | USE OSO-96                 |
| OSO-CT               |    | USE OSO-97                 |
| OSO-CU               |    | USE OSO-98                 |
| OSO-CV               |    | USE OSO-99                 |
| OSO-CW               |    | USE OSO-100                |
| OSO-CX               |    | USE OSO-101                |
| OSO-CY               |    | USE OSO-102                |
| OSO-CZ               |    | USE OSO-103                |
| OSO-DA               |    | USE OSO-104                |
| OSO-DB               |    | USE OSO-105                |
| OSO-DC               |    | USE OSO-106                |
| OSO-DD               |    | USE OSO-107                |
| OSO-DE               |    | USE OSO-108                |
| OSO-DF               |    | USE OSO-109                |
| OSO-DG               |    | USE OSO-110                |
| OSO-DH               |    | USE OSO-111                |
| OSO-DI               |    | USE OSO-112                |
| OSO-DJ               |    | USE OSO-113                |
| OSO-DK               |    | USE OSO-114                |
| OSO-DL               |    | USE OSO-115                |
| OSO-DM               |    | USE OSO-116                |
| OSO-DN               |    | USE OSO-117                |
| OSO-DO               |    | USE OSO-118                |
| OSO-DP               |    | USE OSO-119                |
| OSO-DQ               |    | USE OSO-120                |
| OSO-DR               |    | USE OSO-121                |
| OSO-DS               |    | USE OSO-122                |
| OSO-DT               |    | USE OSO-123                |
| OSO-DU               |    | USE OSO-124                |
| OSO-DV               |    | USE OSO-125                |
| OSO-DW               |    | USE OSO-126                |
| OSO-DX               |    | USE OSO-127                |
| OSO-DY               |    | USE OSO-128                |
| OSO-DZ               |    | USE OSO-129                |
| OSO-EA               |    | USE OSO-130                |
| OSO-EB               |    | USE OSO-131                |
| OSO-EC               |    | USE OSO-132                |
| OSO-ED               |    | USE OSO-133                |
| OSO-EE               |    | USE OSO-134                |
| OSO-EF               |    | USE OSO-135                |
| OSO-EG               |    | USE OSO-136                |
| OSO-EH               |    | USE OSO-13                 |

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

GAS EVOLUTION  
PURGING  
RESIDUAL GAS  
TRANSPIRATION  
VACUUM  
VACUUM PUMPS  
  
OUTLET FLOW  
O902 O904  
GS FLUID FLOW  
RT #OUTLET FLOW  
CASCADE FLOW  
CHANNEL FLOW  
% FLOW  
FLOW CHARACTERISTICS  
NOZZLE FLOW  
  
OUTLETS  
O902 O904  
GS #OUTLETS  
VENTS  
RT APERTURES  
CAVITIES  
% DISCHARGE  
DOORS  
DUCTS  
EGRESS  
EXHAUST NOZZLES  
EXHAUST SYSTEMS  
GATES (OPENINGS)  
% NOZZLES  
OPENINGS  
OUTPUT  
PIPE NOZZLES  
PLUGS  
PORTS (OPENINGS)  
% TERMINALS  
  
OUTLETS (GEOLOGY)  
USE ESTUARIES  
  
OUTLIERS (LANDFORMS)  
1305 1306  
UF KLIPPEN  
GS LANDFORMS  
#OUTLIERS (LANDFORMS)  
RT FORMATIONS  
ROCKS  
SOIL EROSION  
  
OUTLIERS (STATISTICS)  
1902  
RT MATHEMATICAL MODELS  
PROBABILITY THEORY  
STATISTICAL ANALYSIS

STATISTICAL DISTRIBUTIONS  
STATISTICAL TESTS  
  
OUTPUT  
O702 1001 1003 O803  
UF DUMMY LOADS  
GS #OUTPUT  
CARDIAC OUTPUT  
HEART MINUTE VOLUME  
STROKE VOLUME  
LASER OUTPUTS  
MASER OUTPUTS  
% CAPACITY  
RT % CATCHERS  
COMPUTER SYSTEMS PERFORMANCE  
DELIVERY  
EFFLUX  
INPUT  
OUTLETS  
% PERFORMANCE  
POWER CONDITIONING  
PRINTOUTS  
% PRODUCTION  
PRODUCTS  
READOUT  
SUPPLYING  
TRACKING PROBLEM  
TRANSFER FUNCTIONS  
TRANSMISSION  
YIELD  
  
OV-1 AIRCRAFT  
O207 3401  
UF AO-1 AIRCRAFT  
GRUMMAN OV-1C AIRCRAFT  
MOHAWK AIRCRAFT  
GS GRUMMAN AIRCRAFT  
#OV-1 AIRCRAFT  
JET AIRCRAFT  
TURBOPROP AIRCRAFT  
#OV-1 AIRCRAFT  
MONOPLANES  
#OV-1 AIRCRAFT  
OBSERVATION AIRCRAFT  
#OV-1 AIRCRAFT  
RT % AIRCRAFT  
  
OV-1 SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
SCIENTIFIC SATELLITES  
#OV-1 SATELLITES  
RT GRAVITY GRADIENT SATELLITES  
SPIN STABILIZATION

OV-2 SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
SCIENTIFIC SATELLITES  
#OV-2 SATELLITES  
RT GRAVITY GRADIENT SATELLITES  
SPIN STABILIZATION  
  
OV-3 SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
SCIENTIFIC SATELLITES  
#OV-3 SATELLITES  
RT GRAVITY GRADIENT SATELLITES  
SPIN STABILIZATION  
  
OV-4 SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
SCIENTIFIC SATELLITES  
#OV-4 SATELLITES  
RT GRAVITY GRADIENT SATELLITES  
SPIN STABILIZATION  
  
OV-5 SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
SCIENTIFIC SATELLITES  
#OV-5 SATELLITES  
RT GRAVITY GRADIENT SATELLITES  
SPIN STABILIZATION  
  
OV-10 AIRCRAFT  
O207  
UF NA-300 AIRCRAFT  
ATTACK AIRCRAFT  
GS #OV-10 AIRCRAFT  
COIN AIRCRAFT  
#OV-10 AIRCRAFT  
JET AIRCRAFT  
TURBOPROP AIRCRAFT  
#OV-10 AIRCRAFT  
MONOPLANES  
#OV-10 AIRCRAFT  
NORTH AMERICAN AIRCRAFT  
#OV-10 AIRCRAFT  
OBSERVATION AIRCRAFT  
#OV-10 AIRCRAFT  
RECONNAISSANCE AIRCRAFT  
#OV-10 AIRCRAFT  
RT % AIRCRAFT  
  
OVARIES  
O404 O405  
GS ANATOMY



|                           |  |                          |  |                              |  |
|---------------------------|--|--------------------------|--|------------------------------|--|
| . GENITOURINARY SYSTEM    |  | OVERPRESSURE             |  | OXIDASE                      |  |
| .. REPRODUCTIVE SYSTEMS   |  | 0710 1201 1202 1203 1308 |  | 0403 0603 1808               |  |
| ... SEX GLANDS            |  | GS PRESSURE              |  | GS ACIDS                     |  |
| ... GONADS                |  | RT OVERPRESSURE          |  | #OXIDASE                     |  |
| ... OVARIES               |  | BLAST LOADS              |  | BIOPOLYMERS                  |  |
| . GLANDS (ANATOMY)        |  | DYNAMIC PRESSURE         |  | . PROTEINS                   |  |
| .. ENDOCRINE GLANDS       |  |                          |  | .. ENZYMES                   |  |
| ... GONADS                |  |                          |  | .. #OXIDASE                  |  |
| ... OVARIES               |  |                          |  | ORGANIC COMPOUNDS            |  |
| EGGS                      |  |                          |  | . PROTEINS                   |  |
| MENSTRUATION              |  |                          |  | .. ENZYMES                   |  |
|                           |  |                          |  | .. #OXIDASE                  |  |
| OVENS                     |  |                          |  | OXIDATION                    |  |
| 1504 1704 3303 3404       |  |                          |  | 0603 1702 3301 3407          |  |
| GS HEATING EQUIPMENT      |  |                          |  | GS CHEMICAL REACTIONS        |  |
| #OVENS                    |  |                          |  | #OXIDATION                   |  |
| RT BAKING                 |  |                          |  | .. ELECTROCHEMICAL OXIDATION |  |
| DRY HEAT                  |  |                          |  | .. PHOTOOXIDATION            |  |
| FURNACES                  |  |                          |  | .. RUSTING                   |  |
| WASTE ENERGY UTILIZATION  |  |                          |  | ASOCIATION REACTIONS         |  |
|                           |  |                          |  | CHARRING                     |  |
| OVER-THE-HORIZON RADAR    |  |                          |  | CHEMICAL ATTACK              |  |
| 0705                      |  |                          |  | COMBUSTION                   |  |
| GS RADAR                  |  |                          |  | COMBUSTION CHEMISTRY         |  |
| . SEARCH RADAR            |  |                          |  | CORROSION                    |  |
| .. OVER-THE-HORIZON RADAR |  |                          |  | DEGRADATION                  |  |
| EARLY WARNING SYSTEMS     |  |                          |  | DEHYDROGENATION              |  |
| MOVING TARGET INDICATORS  |  |                          |  | DOPA                         |  |
| OPTICAL RADAR             |  |                          |  | ELECTRON TRANSFER            |  |
| RADAR DETECTION           |  |                          |  | EPOXIDATION                  |  |
| RADAR RANGE               |  |                          |  | EROSIVE BURNING              |  |
|                           |  |                          |  | FUEL COMBUSTION              |  |
| OVERCAST                  |  |                          |  | HOT CORROSION                |  |
| USE CLOUD COVER           |  |                          |  | HYDROCARBON COMBUSTION       |  |
|                           |  |                          |  | METAL COMBUSTION             |  |
| OVERCOMPRESSION           |  |                          |  | OXIDIZERS                    |  |
| USE OVERCONSOLIDATION     |  |                          |  | OXYGENATION                  |  |
|                           |  |                          |  | PASSIVITY                    |  |
| OVERCONSOLIDATION         |  |                          |  | REDUCTION (CHEMISTRY)        |  |
| 3407                      |  |                          |  | ROASTING                     |  |
| UF OVERCOMPRESSION        |  |                          |  | THERMAL RESISTANCE           |  |
| RT CONSOLIDATION          |  |                          |  | TURBULENT COMBUSTION         |  |
| FOUNDATIONS               |  |                          |  |                              |  |
|                           |  |                          |  | OXIDATION RESISTANCE         |  |
| OVERHAUSER EFFECT         |  |                          |  | 0602                         |  |
| 0710                      |  |                          |  | GS CORROSION RESISTANCE      |  |
| RT % EFFECTS              |  |                          |  | #OXIDATION RESISTANCE        |  |
| MAGNETIC RESONANCE        |  |                          |  | RT PASSIVITY                 |  |
| NUCLEAR SPIN              |  |                          |  | % RESISTANCE                 |  |
| % POLARIZATION            |  |                          |  | RUSTING                      |  |
| RESONANCE                 |  |                          |  | SILICONIZING                 |  |
|                           |  |                          |  | THERMAL RESISTANCE           |  |

|                                |                                |                              |
|--------------------------------|--------------------------------|------------------------------|
| OXIDATION-REDUCTION REACTIONS  | ....AKERMANITE                 | ....NITROGEN TETROXIDE       |
| 0603                           | ....MAGNESIUM OXIDES           | ....NITROUS OXIDES           |
| GS                             | ....AKERMANITE                 | ....PHOSPHORUS OXIDES        |
| CHEMICAL REACTIONS             | ....PERICLASE                  | ....PYROXENES                |
| #OXIDATION-REDUCTION REACTIONS | ....ALUMINUM OXIDES            | ....ENSTATITE                |
| RT                             | ....SAPPHIRE                   | ....SELENIUM OXIDES          |
| ELECTROCHEMISTRY               | ....BISMUTH OXIDES             | ....SILICON OXIDES           |
| REDUCTION (CHEMISTRY)          | ....CERIUM OXIDES              | ....MUSCOVITE                |
|                                | ....CESIUM OXIDES              | ....NEPHELITE                |
|                                | ....CHROMIUM OXIDES            | ....SILICON DIOXIDE          |
|                                | ....COBALT OXIDES              | ....QUARTZ                   |
|                                | ....COPPER OXIDES              | ....COESITE                  |
|                                | ....GALLIUM OXIDES             | ....STISHOVITE               |
|                                | ....HAFNIUM OXIDES             | ....SPODUMENE                |
|                                | ....IRON OXIDES                | ....SULFUR OXIDES            |
|                                | ....HEMATITE                   | ....SULFUR DIOXIDES          |
|                                | ....ILMENITE                   | ANODIC COATINGS              |
|                                | ....MAGNETITE                  | CATHODIC COATINGS            |
|                                | ....LANTHANUM OXIDES           | ETHYLENE OXIDE               |
|                                | ....LEAD OXIDES                | EUXENITE                     |
|                                | ....LITHIUM OXIDES             | INSULATION                   |
|                                | ....MANGANESE OXIDES           | METAL COATINGS               |
|                                | ....HOPCALITE (TRADEMARK)      | NIOBATES                     |
|                                | ....MERCURY OXIDES             | NONFLAMMABLE MATERIALS       |
|                                | ....MIXED OXIDES               | % OXYGEN COMPOUNDS           |
|                                | ....BSCCO SUPERCONDUCTORS      | WATER                        |
|                                | ....YBCO SUPERCONDUCTORS       |                              |
|                                | ....MOLYBDENUM OXIDES          | OXIDIZERS                    |
|                                | ....NICKEL OXIDES              | 0603 1702 3301               |
|                                | ....NIOBIUM OXIDES             | GS #OXIDIZERS                |
|                                | ....PLATINUM OXIDES            | .HIGH ENERGY OXIDIZERS       |
|                                | ....PLUTONIUM OXIDES           | .LIQUID OXIDIZERS            |
|                                | ....POTASSIUM OXIDES           | .LIQUID OXYGEN               |
|                                | ....SCANDIUM OXIDES            | .PHOTOCHEMICAL OXIDANTS      |
|                                | ....SILVER OXIDES              | .ROCKET OXIDIZERS            |
|                                | ....SODIUM PEROXIDES           | ..FLOX                       |
|                                | ....STRONTIUM OXIDES           | ..TAGN                       |
|                                | ....TANTALUM OXIDES            | RT % AGENTS                  |
|                                | ....THORIUM OXIDES             | AIR POLLUTION                |
|                                | ....TIN OXIDES                 | FLUORINE                     |
|                                | ....TITANIUM OXIDES            | FUELS                        |
|                                | ....ANATASE                    | NITRAMINE PROPELLANTS        |
|                                | ....ILMENITE                   | OXIDATION                    |
|                                | ....RUTILE                     |                              |
|                                | ....TUNGSTEN OXIDES            | OXIMETRY                     |
|                                | ....SCHEELITE                  | 0405 0501                    |
|                                | ....URANIUM OXIDES             | RT BIOCHEMICAL OXYGEN DEMAND |
|                                | ....VANADIUM OXIDES            | BLOOD                        |
|                                | ....YTTRIUM OXIDES             | HYPEROXIA                    |
|                                | ....ZINC OXIDES                | HYPOXIA                      |
|                                | ....ZIRCONIUM OXIDES           | OXYGEN CONSUMPTION           |
|                                | ....YTTRIA-STABILIZED ZIRCONIA |                              |
|                                | ....NITROGEN OXIDES            | OXOSILANES                   |
|                                | ....NITRIC OXIDE               | USE POLYSILANES              |
|                                | ....NITROGEN DIOXIDE           |                              |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OXYACETYLENE<br>O603 1808<br>GS                                                                                                                                                                                                                                                                                                                                                                                                                            | O603 0905 1409<br>UF OXYGEN DETECTORS<br>GS MEASURING INSTRUMENTS<br>#OXYGEN ANALYZERS<br>RT GAS ANALYSIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | USE HYPOXIA<br>OXYGEN DETECTORS<br>USE OXYGEN ANALYZERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ..ALIPHATIC HYDROCARBONS<br>...ALKYNES<br>...#OXYACETYLENE<br>RT ACETYLENE<br>DETONABLE GAS MIXTURES<br>% OXYGEN COMPOUNDS                                                                                                                                                                                                                                                                                                                                 | OXYGEN ATOMS<br>O603 1807 2401<br>GS ATOMS<br>#OXYGEN ATOMS<br>RT OXYGEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OXYGEN FLUORIDES<br>O603 1804<br>GS HALOGEN COMPOUNDS<br>.FLUORINE COMPOUNDS<br>..FLUORIDES<br>...#OXYGEN FLUORIDES<br>..HALIDES<br>...FLUORIDES<br>..#OXYGEN FLUORIDES<br>RT % OXYGEN COMPOUNDS                                                                                                                                                                                                                                                                                                                                                                                                                       |
| OXYALKYLATION<br>USE ALKYLATION<br>OXYFLUORIDES<br>O603<br>GS HALOGEN COMPOUNDS<br>.FLUORINE COMPOUNDS<br>..FLUORIDES<br>...#OXYFLUORIDES<br>..HALIDES<br>..FLUORIDES<br>...#OXYFLUORIDES<br>RT % OXYGEN COMPOUNDS                                                                                                                                                                                                                                         | OXYGEN BREATHING<br>O402 O404 O408<br>RT % BREATHING<br>% OXYGEN COMPOUNDS<br>O603 1804 1808<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT ACIDS<br>ALUMINATES<br>ARSENATES<br>BORATES<br>BROMATES<br>CARBOHYDRATES<br>CARBON SUBOXIDES<br>CARBONATES<br>% CHEMICAL COMPOUNDS<br>CHLORATES<br>CHROMATES<br>GERMANIUM OXIDES<br>NIOBATES<br>OXALATES<br>OXIDES<br>OXYACETYLENE<br>OXYFLUORIDES<br>OXYGEN FLUORIDES<br>OZONATES<br>OZONE FLUORIDE<br>OZONIDES<br>STANNATES<br>OXYGEN CONSUMPTION<br>O404 O408 O506 O603<br>GS CONSUMPTION<br>#OXYGEN CONSUMPTION<br>RT BIOCHEMICAL OXYGEN DEMAND<br>HYPEROXIA<br>HYPOXIA<br>METABOLISM<br>OXIMETRY | OXYGEN IONS<br>O603 0604 1302<br>GS IONS<br>#OXYGEN IONS<br>RT FREE RADICALS<br>NEGATIVE IONS<br>OXYGEN<br>OXYGEN ISOTOPES<br>O603 1804<br>GS CHEMICAL ELEMENTS<br>.NUCLIDES<br>..ISOTOPES<br>...#OXYGEN ISOTOPES<br>....OXYGEN 18<br>...OXYGEN<br>..#OXYGEN ISOTOPES<br>...OXYGEN 17<br>...OXYGEN 18<br>GASES<br>.OXYGEN<br>..#OXYGEN ISOTOPES<br>...OXYGEN 17<br>...OXYGEN 18<br>OXYGEN MASKS<br>O202 O506 O508<br>GS BREATHING APPARATUS<br>#OXYGEN MASKS<br>MASKS<br>#OXYGEN MASKS<br>OXYGEN SUPPLY EQUIPMENT<br>#OXYGEN MASKS<br>HIGH ALTITUDE BREATHING<br>LIFE SUPPORT SYSTEMS<br>PORTABLE LIFE SUPPORT SYSTEMS |
| OXYGEN<br>O603 1807<br>GS CHEMICAL ELEMENTS<br>#OXYGEN<br>..LIQUID OXYGEN<br>..OXYGEN ISOTOPES<br>...OXYGEN 17<br>...OXYGEN 18<br>GASES<br>#OXYGEN<br>..LIQUID OXYGEN<br>..OXYGEN ISOTOPES<br>...OXYGEN 17<br>...OXYGEN 18<br>CHLORELLA<br>HIGH PRESSURE OXYGEN<br>OXYGEN ATOMS<br>OXYGEN IONS<br>OXYGEN PLASMA<br>OZONE<br>REACTION BONDING<br>SCHUMANN-RUNGE BANDS<br>SIALON<br>OXYGEN AFTERGLOW<br>O602 O603 2405<br>GS AFTERGLOWS<br>#OXYGEN AFTERGLOW | OXYGEN DEFICIENCY<br>O404<br>GS CONSUMPTION<br>#OXYGEN CONSUMPTION<br>RT BIOCHEMICAL OXYGEN DEMAND<br>HYPEROXIA<br>HYPOXIA<br>METABOLISM<br>OXIMETRY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OXYGEN METABOLISM<br>O404                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                    |                                                                                                                                                                                              |                                                                                                                                                                                               |    |                                                                                             |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------|
| GS                 | METABOLISM<br>#OXYGEN METABOLISM                                                                                                                                                             | BREATHING APPARATUS<br>CABIN ATMOSPHERES<br>COMPRESSED AIR<br>CONTROLLED ATMOSPHERES<br>EMERGENCY LIFE SUSTAINING SYSTEMS<br>LIFE SUPPORT SYSTEMS<br>PRESSURIZED CABINS<br>SURVIVAL EQUIPMENT | RT | BOOSTER ROCKET ENGINES<br>LIQUID OXYGEN<br>REUSABLE ROCKET ENGINES<br>SPACECRAFT PROPULSION |
| OXYGEN             | PLASMA                                                                                                                                                                                       |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 2502                                                                                                                                                                                         |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | PARTICLES<br>.CHARGED PARTICLES<br>..ENERGETIC PARTICLES<br>..PLASMAS (PHYSICS)<br>...#OXYGEN PLASMA<br>RT ARGON PLASMA<br>HELIUM PLASMA<br>HYDROGEN PLASMA<br>OXYGEN                        |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | PRODUCTION                                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| O404               | O602                                                                                                                                                                                         |                                                                                                                                                                                               |    |                                                                                             |
| RT                 | CLOSED ECOLOGICAL SYSTEMS<br>GAS EXCHANGE                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | RECOMBINATION                                                                                                                                                                                |                                                                                                                                                                                               |    |                                                                                             |
| O602               | O603                                                                                                                                                                                         |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL REACTIONS<br>.ATOMIC RECOMBINATION<br>..#OXYGEN RECOMBINATION<br>RECOMBINATION REACTIONS<br>.ATOMIC RECOMBINATION<br>..#OXYGEN RECOMBINATION<br>RT IONIZATION                       |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | REGULATORS                                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| O401               | O501 O504 O507                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | REGULATORS<br>#OXYGEN REGULATORS<br>FLOW REGULATORS<br>PRESSURE REGULATORS                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| RT                 |                                                                                                                                                                                              |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | SPECTRA                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1411 2402 2405 3009                                                                                                                                                                          |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | SPECTRA<br>#OXYGEN SPECTRA<br>AIRGLOW<br>HERZBERG BANDS<br>MOLECULAR SPECTRA<br>SOLAR SPECTRA                                                                                                |                                                                                                                                                                                               |    |                                                                                             |
| RT                 |                                                                                                                                                                                              |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | SUPPLY EQUIPMENT                                                                                                                                                                             |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1507 3404                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | OXYGEN SYSTEMS<br>#OXYGEN SUPPLY EQUIPMENT<br>.OXYGEN MASKS<br>RT AEPS                                                                                                                       |                                                                                                                                                                                               |    |                                                                                             |
| RT                 | AIR CONDITIONING EQUIPMENT                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | SYSTEMS                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| USE                | OXYGEN SUPPLY EQUIPMENT                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TENSION                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| O402               | O404 O408                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | PRESSURE<br>.PARTIAL PRESSURE<br>..#OXYGEN TENSION<br>...HYPOXEMIA                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TOXICITY                                                                                                                                                                                     |                                                                                                                                                                                               |    |                                                                                             |
| USE                | HYPEROXIA                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | 17                                                                                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| 1400               |                                                                                                                                                                                              |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL ELEMENTS<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 17<br>GASES<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 17                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | 18                                                                                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1807 2406                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL ELEMENTS<br>.NUCLIDES<br>..ISOTOPES<br>...OXYGEN ISOTOPES<br>...#OXYGEN 18<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 18<br>GASES<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 18 |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN-HYDROCARBON | ROCKET ENGINES                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| 2804               | 2808                                                                                                                                                                                         |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | LIQUID OXYGEN HYDROCARBON ROCKET ENGINES<br>LOX-HYDROCARBON ROCKET ENGINES<br>GASES<br>ENGINE                                                                                                |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | ROCKET ENGINES                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | HYDROCARBON ROCKET ENGINES                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1507 3404                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | OXYGEN SYSTEMS<br>#OXYGEN SUPPLY EQUIPMENT<br>.OXYGEN MASKS<br>RT AEPS                                                                                                                       |                                                                                                                                                                                               |    |                                                                                             |
| RT                 | AIR CONDITIONING EQUIPMENT                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | SYSTEMS                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| USE                | OXYGEN SUPPLY EQUIPMENT                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TENSION                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| O402               | O404 O408                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | PRESSURE<br>.PARTIAL PRESSURE<br>..#OXYGEN TENSION<br>...HYPOXEMIA                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TOXICITY                                                                                                                                                                                     |                                                                                                                                                                                               |    |                                                                                             |
| USE                | HYPEROXIA                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | 17                                                                                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| 1400               |                                                                                                                                                                                              |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL ELEMENTS<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 17<br>GASES<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 17                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | 18                                                                                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1807 2406                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL ELEMENTS<br>.NUCLIDES<br>..ISOTOPES<br>...OXYGEN ISOTOPES<br>...#OXYGEN 18<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 18<br>GASES<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 18 |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN-HYDROCARBON | ROCKET ENGINES                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| 2804               | 2808                                                                                                                                                                                         |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | LIQUID OXYGEN HYDROCARBON ROCKET ENGINES<br>LOX-HYDROCARBON ROCKET ENGINES<br>GASES<br>ENGINE                                                                                                |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | ROCKET ENGINES                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | HYDROCARBON ROCKET ENGINES                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1507 3404                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | OXYGEN SYSTEMS<br>#OXYGEN SUPPLY EQUIPMENT<br>.OXYGEN MASKS<br>RT AEPS                                                                                                                       |                                                                                                                                                                                               |    |                                                                                             |
| RT                 | AIR CONDITIONING EQUIPMENT                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | SYSTEMS                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| USE                | OXYGEN SUPPLY EQUIPMENT                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TENSION                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| O402               | O404 O408                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | PRESSURE<br>.PARTIAL PRESSURE<br>..#OXYGEN TENSION<br>...HYPOXEMIA                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TOXICITY                                                                                                                                                                                     |                                                                                                                                                                                               |    |                                                                                             |
| USE                | HYPEROXIA                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | 17                                                                                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| 1400               |                                                                                                                                                                                              |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL ELEMENTS<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 17<br>GASES<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 17                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | 18                                                                                                                                                                                           |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1807 2406                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | CHEMICAL ELEMENTS<br>.NUCLIDES<br>..ISOTOPES<br>...OXYGEN ISOTOPES<br>...#OXYGEN 18<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 18<br>GASES<br>.OXYGEN<br>..OXYGEN ISOTOPES<br>..#OXYGEN 18 |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN-HYDROCARBON | ROCKET ENGINES                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| 2804               | 2808                                                                                                                                                                                         |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | LIQUID OXYGEN HYDROCARBON ROCKET ENGINES<br>LOX-HYDROCARBON ROCKET ENGINES<br>GASES<br>ENGINE                                                                                                |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | ROCKET ENGINES                                                                                                                                                                               |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | HYDROCARBON ROCKET ENGINES                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| O603               | 1507 3404                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| UF                 | OXYGEN SYSTEMS<br>#OXYGEN SUPPLY EQUIPMENT<br>.OXYGEN MASKS<br>RT AEPS                                                                                                                       |                                                                                                                                                                                               |    |                                                                                             |
| RT                 | AIR CONDITIONING EQUIPMENT                                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | SYSTEMS                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| USE                | OXYGEN SUPPLY EQUIPMENT                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| OXYGEN             | TENSION                                                                                                                                                                                      |                                                                                                                                                                                               |    |                                                                                             |
| O402               | O404 O408                                                                                                                                                                                    |                                                                                                                                                                                               |    |                                                                                             |
| GS                 | PRESSURE<br>.PARTIAL PRESSURE<br>..#OXYGEN                                                                                                                                                   |                                                                                                                                                                                               |    |                                                                                             |

# NASA THESAURUS HIERARCHICAL UPDATE

OXYGEN  
 OZONATES  
 OZONE FLUORIDE  
 OZONIDES  
 OZONOMETRY  
 PHOTOCHEMICAL OXIDANTS  
 SAGE SATELLITE  
 SOLAR MESOSPHERE EXPLORER

OZONE DEPLETION  
 O603 1804 2003  
 UF OZONE HOLES  
 GS DEPLETION  
 #OZONE DEPLETION  
 AIR POLLUTION  
 ANTARCTIC REGIONS  
 ARCTIC REGIONS  
 ATMOSPHERIC COMPOSITION  
 CHLOROFLUOROCARBONS  
 CHLOROFLUOROMETHANE  
 OZONOMETRY  
 OZONOSPHERE  
 TOTAL OZONE MAPPING SPECTROMETER

OZONE FLUORIDE  
 O603 1804  
 GS HALOGEN COMPOUNDS  
 .FLUORINE COMPOUNDS  
 ..FLUORIDES  
 ..#OZONE FLUORIDE  
 .HALIDES  
 ..FLUORIDES  
 ..#OZONE FLUORIDE  
 RT % OXYGEN COMPOUNDS  
 OZONE

OZONE HOLES  
 USE OZONE DEPLETION  
 OZONE LAYER  
 USE OZONOSPHERE

OZONIDES  
 O603 1804  
 RT % OXYGEN COMPOUNDS  
 OZONE

OZONOMETRY  
 O603 1406  
 GS CHEMICAL TESTS  
 .CHEMICAL ANALYSIS  
 ..GAS ANALYSIS  
 ..#OZONOMETRY  
 RT OZONE  
 OZONE DEPLETION

## TOTAL OZONE MAPPING SPECTROMETER

OZONOSPHERE  
 1302 2003 3009  
 UF OZONE LAYER  
 GS EARTH ATMOSPHERE  
 .MIDDLE ATMOSPHERE  
 ..STRATOSPHERE  
 ..#OZONOSPHERE  
 CHEMOSPHERE  
 CHLOROFLUOROCARBONS  
 HOMOSPHERE  
 OZONE DEPLETION  
 UMKEHR EFFECT  
 UPPER ATMOSPHERE

P BAND  
 O702 0705 0710 1002 2402  
 SN (225 TO 390 MHZ)  
 GS FREQUENCIES  
 .RADIO FREQUENCIES  
 ..MICROWAVE FREQUENCIES  
 ..#P BAND  
 ..ULTRAHIGH FREQUENCIES  
 ..#P BAND  
 ..VERY HIGH FREQUENCIES  
 ..#P BAND

P WAVES  
 O710 1202 1307 1308  
 GS ELASTIC WAVES  
 #P WAVES  
 RT COMPRESSIBLE FLUIDS  
 COMPRESSION WAVES  
 CRUSTAL FRACTURES  
 DILATATIONAL WAVES  
 S WAVES  
 SEISMIC WAVES  
 SURFACE WAVES

P.A.C.M. TELEMETRY  
 O702 0708  
 SN (PULSE AMPLITUDE CODE MODULATION)  
 GS TELECOMMUNICATION  
 .TELEMETRY  
 .#P.A.C.M. TELEMETRY  
 TRANSMISSION  
 .SIGNAL TRANSMISSION  
 ..TELEMETRY  
 ..#P.A.C.M. TELEMETRY  
 AMPLITUDE MODULATION  
 COMMUNICATION EQUIPMENT  
 DIFFERENTIAL PULSE CODE MODULATION  
 MODULATION  
 PULSE AMPLITUDE MODULATION

## PULSE CODE MODULATION

P-I-N DIODES  
 USE DIODES  
 P-I-N JUNCTIONS

P-I-N JUNCTIONS  
 O906 2602  
 UF P-I-N DIODES  
 GS SEMICONDUCTOR JUNCTIONS  
 #P-I-N JUNCTIONS  
 RT DIODES  
 % JUNCTIONS  
 SOLAR CELLS

P-N JUNCTIONS  
 O906 2602  
 UF N-P JUNCTIONS  
 GS SEMICONDUCTOR JUNCTIONS  
 #P-N JUNCTIONS  
 RT % JUNCTIONS  
 SIS (SEMICONDUCTORS)

P-N-P JUNCTIONS  
 O906 2602  
 GS SEMICONDUCTOR JUNCTIONS  
 #P-N-P JUNCTIONS  
 RT % JUNCTIONS

P-N-P-N JUNCTIONS  
 O902 2602  
 GS SEMICONDUCTOR JUNCTIONS  
 #P-N-P-N JUNCTIONS  
 RT % JUNCTIONS  
 LATCH-UP  
 THYRISTORS

P-TYPE SEMICONDUCTORS  
 O906 2602  
 GS SEMICONDUCTORS (MATERIALS)  
 #P-TYPE SEMICONDUCTORS  
 RT HOLES (ELECTRON DEFICIENCIES)  
 SEMICONDUCTOR JUNCTIONS

P-1 ENGINE  
 2808  
 GS ENGINES  
 .ROCKET ENGINES  
 ..BOOSTER ROCKET ENGINES  
 ..#P-1 ENGINE  
 ..SOLID PROPELLANT ROCKET ENGINES  
 ..#P-1 ENGINE

P-3 AIRCRAFT  
 O207 3401



# NASA THESAURUS HIERARCHICAL UPDATE

...KURILE ISLANDS  
 ...NEW GUINEA (ISLAND)  
 ...NEW ZEALAND  
 ...PHILIPPINES  
 ...SAMOA

## PACIFIC NORTHWEST (US)

1305  
 GS REGIONS  
 #PACIFIC NORTHWEST (US)  
 RT CANADA  
 UNITED STATES

## PACIFIC OCEAN

1305 1310  
 GS OCEANS  
 #PACIFIC OCEAN  
 RT BERING SEA  
 COASTAL RANGES (CA)  
 EL NINO  
 GULF OF ALASKA  
 GULF OF CALIFORNIA (MEXICO)  
 INDONESIA  
 MID-OCEAN RIDGES  
 MONTEREY BAY (CA)  
 SAN FRANCISCO BAY (CA)  
 SEA OF OKHOTSK  
 SOUTHERN CALIFORNIA

## PACKAGES

O202 1103 1502 1504 3203 3404  
 GS #PACKAGES  
 .INSTRUMENT PACKAGES  
 ...APOLLO LUNAR SURFACE EXPERIMENTS  
 PACKAGE  
 ..EASEP  
 ...EREP

## RT

BAGS  
 BOXES (CONTAINERS)  
 BUNDLES  
 CARTRIDGES  
 CASES (CONTAINERS)  
 % CONTAINERS  
 % INSTRUMENTS  
 PACKAGING

## PACKAGING

1002 3404  
 GS #PACKAGING  
 .ELECTRONIC PACKAGING  
 RT % CONTAINERS  
 CORROSION PREVENTION  
 ENCAPSULATING  
 ENCLOSURE  
 HAULING

HOPPERS  
 INHIBITORS  
 MARKING  
 MATERIALS HANDLING  
 PACKAGES  
 % PACKING  
 PRESERVING  
 SEALERS  
 SPIRAL WRAPPING  
 % STORAGE  
 TRANSPORTATION  
 VERMICULITE  
 WEATHERPROOFING  
 % WRAP

## PACKET SWITCHING

O708  
 GS SWITCHING  
 #PACKET SWITCHING  
 RT BEAM SWITCHING  
 COMMUNICATION NETWORKS  
 DATA TRANSMISSION  
 INTERRUPTION  
 MICROWAVE SWITCHING  
 MULTIPLE ACCESS  
 NETWORK CONTROL  
 PACKET TRANSMISSION  
 PACKETS (COMMUNICATION)  
 PROTOCOL (COMPUTERS)  
 RADIO TRANSMISSION  
 SEQUENCING  
 SIGNAL TRANSMISSION  
 SWITCHING CIRCUITS  
 SWITCHING THEORY  
 TELECOMMUNICATION  
 TIME DIVISION MULTIPLE ACCESS

## PACKET

O702  
 GS TELECOMMUNICATION  
 #PACKET TRANSMISSION  
 ..ALOHA SYSTEM  
 TRANSMISSION  
 .SIGNAL TRANSMISSION  
 ..DATA TRANSMISSION  
 ..#PACKET TRANSMISSION  
 ....ALOHA SYSTEM  
 AUTOMATIC REPEAT REQUEST  
 CHANNEL CAPACITY  
 MESSAGE PROCESSING  
 PACKET SWITCHING  
 PACKETS (COMMUNICATION)  
 SATELLITE COMMUNICATION  
 SPACECRAFT COMMUNICATION  
 TRANSMISSION EFFICIENCY

## RT

PACKETS (COMMUNICATION)  
 O702  
 RT ALOHA SYSTEM  
 COMMUNICATION NETWORKS  
 DATA TRANSMISSION  
 PACKET SWITCHING  
 PACKET TRANSMISSION  
 TRANSMISSION EFFICIENCY  
 WAVE PACKETS

## % PACKING

1103 1502 1504 3407  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT PACKAGING  
 PACKING DENSITY  
 PACKINGS (SEALS)  
 SEALING

## PACKING DENSITY

2404 2601  
 GS DENSITY (NUMBER/VOLUME)  
 #PACKING DENSITY  
 RT BRAVAIS CRYSTALS  
 CRYSTAL STRUCTURE  
 CRYSTALS  
 % PACKING  
 VOID RATIO

## PACKINGS (SEALS)

1501 1504  
 GS SEALS (STOPPERS)  
 #PACKINGS (SEALS)  
 RT BEARINGS  
 GLANDS (SEALS)  
 LABYRINTH SEALS  
 % PACKING  
 PUMPS  
 SEALERS  
 SEALING  
 SHAFTS (MACHINE ELEMENTS)  
 VALVES

## % PAD

O403  
 SN O903 1104 1504  
 (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT CUSHIONS  
 FOUNDATIONS  
 LAUNCHING PADS

## PADDLES

1504  
RT FOLDING STRUCTURES  
MIXERS  
SOLAR GENERATORS  
TURBOMACHINE BLADES

PADE APPROXIMATION  
1902 3501  
GS ANALYSIS (MATHEMATICS)  
.CALCULUS  
..SERIES (MATHEMATICS)  
..#PADE APPROXIMATION  
.NUMERICAL ANALYSIS  
..APPROXIMATION  
..#PADE APPROXIMATION  
.REAL VARIABLES  
..SERIES (MATHEMATICS)  
..#PADE APPROXIMATION

PAGEOS SATELLITE  
2004 3107  
GS ARTIFICIAL SATELLITES  
.GEODETIC SATELLITES  
..PAGEOS SATELLITE  
..PASSIVE SATELLITES  
..#PAGEOS SATELLITE  
EXPLORER 29 SATELLITE  
EXPLORER 36 SATELLITE  
GEOS 1 SATELLITE  
GEOS 2 SATELLITE  
GEOS 3 SATELLITE

PAIN  
0401 0404 0405 0408  
GS PERCEPTION  
.SENSORY PERCEPTION  
..#PAIN  
RT ANALGESIA

PAIN SENSITIVITY  
0404 0408  
GS PERCEPTION  
.SENSORY PERCEPTION  
..#PAIN SENSITIVITY  
SENSITIVITY  
#PAIN SENSITIVITY

PAINTS  
1802 1808 3404  
GS COATINGS  
#PAINTS  
RT FILLERS  
FINISHES  
METAL COATINGS  
PIGMENTS

PRIMERS (COATINGS)  
PROTECTIVE COATINGS  
RUBBER COATINGS  
SEALERS  
SPRAYED COATINGS  
TURPENTINE  
VARNISHES

PAIR PRODUCTION  
2403 2405 3407  
GS PARTICLE PRODUCTION  
#PAIR PRODUCTION  
RT ELECTROMAGNETIC ABSORPTION  
ELECTRON EMISSION  
ELECTRON PHOTON CASCADES  
ELECTRON-POSITRON PAIRS  
EMISSION  
HIGH ENERGY INTERACTIONS  
NUCLEAR REACTIONS  
PHOTOPRODUCTION  
POSITRON ANNIHILATION  
POSITRONS

PAKISTAN  
1305  
GS NATIONS  
#PAKISTAN  
RT ASIA  
BANGLADESH  
HIMALAYAS  
PAKISTAN SPACE PROGRAM

PAKISTAN SPACE PROGRAM  
3009 3409  
GS PROGRAMS  
.SPACE PROGRAMS  
..#PAKISTAN SPACE PROGRAM  
RT PAKISTAN

PALAPA B SATELLITE  
USE PALAPA 2 SATELLITE

PALAPA SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
.COMMUNICATION SATELLITES  
..PALAPA SATELLITES  
...PALAPA 2 SATELLITE  
RT INDONESIAN SPACE PROGRAM  
INTERNATIONAL COOPERATION

PALAPA 2 SATELLITE  
3107  
UF PAL SATELLITE  
GS ART: SATELLITES

PALEOBIOLOGY  
1304  
RT ARCHAEBACTERIA  
% BIOLOGY  
CRETACEOUS-TERTIARY BOUNDARY  
FOSSILS  
GEOCHEMISTRY  
GEOCHRONOLOGY  
PALEONTOLOGY

PALEOCLIMATOLOGY  
1308 2001 2003  
GS CLIMATOLOGY  
#PALEOCLIMATOLOGY  
RT CLIMATE  
CLIMATE CHANGE  
PALEONTOLOGY

PALEOMAGNETISM  
1304 1306 1307 3009  
GS MAGNETIC FIELDS  
#PALEOMAGNETISM  
MAGNETIC PROPERTIES  
#PALEOMAGNETISM  
RT ARCHAEOLOGY  
CONES (VOLCANOES)  
CONTINENTAL DRIFT  
GEOLOGY  
GEOMAGNETISM  
GEOPHYSICS  
MARS VOLCANOES  
REMANENCE  
ROCKS  
VOLCANOES  
VOLCANOLOGY

PALEONTOLOGY  
1304 1306 1308  
RT ARCHAEBACTERIA  
CAMBRIAN PERIOD  
CENOZOIC ERA  
CRETACEOUS PERIOD  
CRETACEOUS-TERTIARY BOUNDARY  
FORMATIONS  
FOSSILS  
GEOCHEMISTRY  
GEOCHRONOLOGY  
GEOLOGICAL SURVEYS  
GEOLOGY



# NASA THESAURUS HIERARCHICAL UPDATE

HISTORIES  
 MESOZOIC ERA  
 PALEOBIOLOGY  
 PALEOCLIMATOLOGY  
 PALEOZOIC ERA  
 PRECAMBRIAN PERIOD  
 PROTObIOLOGY  
 STRATIGRAPHY  
 TERTIARY PERIOD

PALEOZOIC ERA  
 1306  
 GS #PALEOZOIC ERA  
 .CAMBRIAN PERIOD  
 RT GEOCHRONOLOGY  
 MESOZOIC ERA  
 PALEONTOLOGY  
 PRECAMBRIAN PERIOD

PALLADIUM  
 0603 1703  
 GS CHEMICAL ELEMENTS  
 #PALLADIUM  
 METALS  
 .TRANSITION METALS  
 .#PALLADIUM  
 RT PALLADIUM ISOTOPES

PALLADIUM ALLOYS  
 1701 1704  
 GS ALLOYS  
 #PALLADIUM ALLOYS

PALLADIUM COMPOUNDS  
 0603  
 RT % CHEMICAL COMPOUNDS  
 METALS  
 TRANSITION METALS

PALLADIUM ISOTOPES  
 0603 2406  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 ..ISOTOPES  
 ..#PALLADIUM ISOTOPES  
 RT PALLADIUM

PALMAR SWEAT INDEX  
 0408 0410 0501  
 RT PERSPIRATION  
 STRESS (PHYSIOLOGY)  
 STRESS (PSYCHOLOGY)

PALMGREN-MINER RULE  
 0201 3203 3204

MINER RULE  
 RULES  
 #PALMGREN-MINER RULE  
 FATIGUE LIFE

PALMITIC ACID  
 0403 1808  
 GS ACIDS  
 .CARBOXYLIC ACIDS  
 ..FATTY ACIDS  
 ..#PALMITIC ACID  
 ORGANIC COMPOUNDS  
 .CARBOXYLIC ACIDS  
 ..FATTY ACIDS  
 ..#PALMITIC ACID  
 RT FATS

PALO VERDE VALLEY (CA)  
 1305  
 GS VALLEYS  
 #PALO VERDE VALLEY (CA)  
 RT CALIFORNIA  
 DESERTS

PAM (MODULATION)  
 USE PULSE AMPLITUDE MODULATION

PAMPAS  
 1306  
 GS LAND  
 .PLAINS  
 .#PAMPAS

PAN (POLYACRYLONITRILE)  
 USE POLYACRYLONITRILE

PANAMA  
 1305  
 GS NATIONS  
 #PANAMA  
 RT CANALS  
 CENTRAL AMERICA

PANAMA CANAL ZONE  
 1305  
 GS LANDFORMS  
 #PANAMA CANAL ZONE  
 REGIONS  
 #PANAMA CANAL ZONE  
 RT CARIBBEAN SEA  
 CENTRAL AMERICA  
 UNITED STATES

PANAVIA MILITARY AIRCRAFT  
 0101 0206 3403

RT % AIRCRAFT  
 AIRCRAFT DESIGN  
 FIGHTER AIRCRAFT  
 % MILITARY AIRCRAFT  
 VARIABLE SWEEP WINGS  
 WEAPON SYSTEMS

PANCREAS  
 0404 0405 0408  
 GS ANATOMY  
 .DIGESTIVE SYSTEM  
 .#PANCREAS  
 .GLANDS (ANATOMY)  
 ..ENDOCRINE GLANDS  
 ..#PANCREAS  
 DIABETES MELLITUS  
 RT GASTROINTESTINAL SYSTEM  
 TRYPSIN

PANEL FLUTTER  
 0201 0202 1507  
 GS VIBRATION  
 .STRUCTURAL VIBRATION  
 ..FLUTTER  
 ..#PANEL FLUTTER  
 ..SELF INDUCED VIBRATION  
 ..#PANEL FLUTTER  
 AERODYNAMIC NOISE  
 AEROELASTICITY  
 BENDING VIBRATION

RT  
 AERODYNAMIC NOISE  
 AEROELASTICITY  
 BENDING VIBRATION

PANEL METHOD (FLUID DYNAMICS)  
 1201 3501  
 GS PROCEDURES  
 #PANEL METHOD (FLUID DYNAMICS)  
 RT BERNOULLI THEOREM  
 BOUNDARY LAYERS  
 COMPUTATIONAL FLUID DYNAMICS  
 FINITE ELEMENT METHOD  
 % FLOW  
 FLOW THEORY  
 FLUID DYNAMICS  
 FLUX VECTOR SPLITTING  
 GAS-SOLID INTERACTIONS  
 % METHODOLOGY  
 TURBULENCE  
 VORTEX LATTICE METHOD

PANELS  
 3202 3203 3406 3409  
 SN (EXCLUDES GROUPS OF PEOPLE)  
 GS #PANELS  
 .CURVED PANELS  
 .RECTANGULAR PANELS  
 .WING PANELS

RT BAFFLES  
CEILINGS (ARCHITECTURE)  
% CONSTRUCTION MATERIALS  
DIVIDERS  
FLAT PLATES  
% PLATES  
% SHEETS  
SHIELDING  
THIN PLATES  
WALLS

PANIC  
O408  
RT EMOTIONAL FACTORS  
EMOTIONS  
FEAR  
HUMAN BEHAVIOR

PANORAMIC CAMERAS  
1407 1412  
GS OPTICAL EQUIPMENT  
.CAMERAS  
.#PANORAMIC CAMERAS  
PHOTOGRAPHIC EQUIPMENT  
.CAMERAS  
.#PANORAMIC CAMERAS  
CAMERA SHUTTERS  
FOCUSING  
LENSES  
PHOTOGRAPHY  
WIDE ANGLE LENSES

PANORAMIC SCANNING  
0702 0705  
GS SCANNING  
.#PANORAMIC SCANNING  
RT CONICAL SCANNING  
FREQUENCY SCANNING  
MULTISPECTRAL BAND SCANNERS  
RADAR SCANNING  
SCANNERS  
SEARCHING  
SURVEILLANCE

PANSPERMIA  
0401  
RT ABIOTIC GENESIS  
AEROSPACE ENVIRONMENTS  
BACTERIA  
BIOLOGICAL EVOLUTION  
EXO BIOLOGY  
EXTRATERRESTRIAL LIFE  
FUNGI

PANIC PROGRAM

3406  
UF ABLATED NOSETIPS  
GS PASSIVE NOSETIP TECHNOLOGY  
PROGRAMS  
#PANT PROGRAM

PANTAR CHONDRITES  
1806 3005  
GS CELESTIAL BODIES  
.METEORITES  
..STONY METEORITES  
...CHONDRITES  
...#PANTAR CHONDRITES

PANTHER AIRCRAFT  
USE F-9 AIRCRAFT

PAPAIN  
0603 1808  
GS BIOPOLYMERS  
.PROTEINS  
..ENZYMES  
...#PAPAIN  
ORGANIC COMPOUNDS  
.PROTEINS  
..ENZYMES  
...#PAPAIN  
RT PEPSIN

PAPER (MATERIAL)  
0603  
RT BOARDS (PAPER)  
KRAFT PROCESS (WOODPULP)  
% MATERIALS  
ORGANIC MATERIALS  
WEBS (SHEETS)  
WOOD

PAPER CHROMATOGRAPHY  
0601 0602  
GS CHEMICAL TESTS  
.CHEMICAL ANALYSIS  
..CHROMATOGRAPHY  
...#PAPER CHROMATOGRAPHY  
RT GAS CHROMATOGRAPHY  
LIQUID CHROMATOGRAPHY

PAPERS  
3405  
GS DOCUMENTS  
#PAPERS  
RT BOARDS (PAPER)  
CONFERENCES  
FIBERS  
% FILMS

PAPILLAE  
0402 0404  
RT PROTUBERANCES

PAPUA NEW GUINEA  
1305  
GS NATIONS  
#PAPUA NEW GUINEA  
RT ASIA  
AUSTRALIA  
NEW GUINEA (ISLAND)

PARA HYDROGEN  
0603  
GS GASES  
#PARA HYDROGEN  
RT HYDROGEN  
ORTHO PARA CONVERSION

PARABOLAS  
1902  
GS GEOMETRY  
.EUCLIDEAN GEOMETRY  
..ANALYTIC GEOMETRY  
...CONICS  
...#PARABOLAS

PARABOLIC ANTENNAS  
0701 0705 0905 0901  
GS ANTENNAS  
.DIRECTIONAL ANTENNAS  
..REFLECTOR ANTENNAS  
...#PARABOLIC ANTENNAS  
RT ANTENNA DESIGN  
CASSEGRAIN ANTENNAS  
HORN ANTENNAS  
MICROWAVE ANTENNAS  
RADAR ANTENNAS  
RADAR EQUIPMENT  
RADAR REFLECTORS

PARABOLIC BODIES  
1902 0102  
UF PARABOLOID  
GS SYMMETRIC BODIES  
...#PARABOLIC BODIES

# NASA THESAURUS HIERARCHICAL UPDATE

PARABOLIC DIFFERENTIAL EQUATIONS  
 1902 3501  
 GS ANALYSIS (MATHEMATICS)  
 .REAL VARIABLES  
 ..DIFFERENTIAL EQUATIONS  
 ...PARTIAL DIFFERENTIAL EQUATIONS  
 ...#PARABOLIC DIFFERENTIAL EQUATIONS  
 EQUATIONS  
 RT % EQUATIONS

PARABOLIC FLIGHT  
 0201 1904 3006  
 RT ASCENT TRAJECTORIES  
 BALLISTIC TRAJECTORIES  
 CLIMBING FLIGHT  
 COASTING FLIGHT  
 DESCENT TRAJECTORIES  
 % FLIGHT  
 MIDCOURSE TRAJECTORIES  
 MISSILE TRAJECTORIES  
 SUBORBITAL FLIGHT  
 TRAJECTORIES  
 WEIGHTLESSNESS  
 WEIGHTLESSNESS SIMULATION

PARABOLIC REFLECTORS  
 0705 0710 0901  
 UF DISHES  
 GS REFLECTORS  
 #PARABOLIC REFLECTORS  
 ..PARABOLOID MIRRORS  
 MICROWAVE ANTENNAS  
 RADAR REFLECTORS  
 REFLECTOR ANTENNAS  
 SCHWARZSCHILD ANTENNAS  
 SOLAR REFLECTORS

PARABOLIC VELOCITY  
 USE ESCAPE VELOCITY

PARABOLOID MIRRORS  
 0710 0901 2306 2310  
 GS MIRRORS  
 #PARABOLOID MIRRORS  
 REFLECTORS  
 .PARABOLIC REFLECTORS  
 .#PARABOLOID MIRRORS  
 RT REFLECTING TELESCOPES  
 SOLAR REFLECTORS

PARABOLOIDS  
 USE PARABOLIC BODIES

PARACHUTE DESCENT

0208  
 UF PARACHUTING  
 GS DESCENT  
 #PARACHUTE DESCENT  
 RT BAILOUT  
 EJECTION  
 EJECTION TRAINING  
 ESCAPE (ABANDONMENT)  
 FREE FALL  
 PARACHUTES

PARACHUTE FABRICS  
 0208 1811  
 GS FABRICS  
 #PARACHUTE FABRICS  
 RT FORTISAN (TRADEMARK)  
 GORES  
 PARACHUTES

PARACHUTES  
 0203 0208 0508  
 GS #PARACHUTES  
 .DRAG CHUTES  
 .RECOVERY PARACHUTES  
 .RIBBON PARACHUTES  
 .ROTOCHUTES  
 RT AERODYNAMIC BRAKES  
 AIR DROP OPERATIONS  
 AIRDROPS  
 BALLUTES  
 BRAKES (FOR ARRESTING MOTION)  
 FOLDING STRUCTURES  
 PARACHUTE DESCENT  
 PARACHUTE FABRICS  
 PARACONE  
 PARAVULCOONS  
 PARAWINGS  
 TOWED BODIES  
 WHIRL TOWERS

PARACHUTING  
 USE PARACHUTE DESCENT

PARACHUTING INJURY  
 0405 0408  
 GS INJURIES  
 #PARACHUTING INJURY

PARACONE  
 0203  
 RT ESCAPE CAPSULES  
 ESCAPE SYSTEMS  
 PARACHUTES

PARADOXES

1902 2311 3406  
 GS KNOWLEDGE  
 .PHILOSOPHY  
 .#PARADOXES  
 RT % LOGIC  
 RELATIVITY

PARAFFINS  
 0603 1808  
 GS ORGANIC COMPOUNDS  
 .HYDROCARBONS  
 ..ALIPHATIC HYDROCARBONS  
 ...ALKANES  
 ...#PARAFFINS  
 ....CERESIN  
 RT HYDROCARBON FUELS  
 KEROSENE  
 SHALE OIL

PARAGLIDERS  
 0201 0205  
 GS GLIDERS  
 #PARAGLIDERS  
 ..INFLATABLE GLIDERS  
 RT FOLDING STRUCTURES  
 HYPERSONIC GLIDERS  
 PARAWINGS  
 % SUBSONIC AIRCRAFT

PARAGUAY  
 1305  
 GS NATIONS  
 #PARAGUAY  
 RT SOUTH AMERICA

PARALLAX  
 1901 2306 2310 3001  
 GS #PARALLAX  
 .SOLAR PARALLAX  
 .STELLAR PARALLAX  
 RT ASTROMETRY  
 COMPANION STARS  
 % OPTICS

PARALLEL COMPUTERS  
 0801  
 GS DATA PROCESSING EQUIPMENT  
 .COMPUTERS  
 ..DIGITAL COMPUTERS  
 ..#PARALLEL COMPUTERS  
 ....MASSIVELY PARALLEL PROCESSORS  
 ....CONNECTION MACHINE  
 ....MIMD (COMPUTERS)  
 ....SIMD (COMPUTERS)

RT HYPERCUBE MULTIPROCESSORS

```

PARALLEL FLOW
1201 1202
GS
  FLUID FLOW
  #PARALLEL FLOW
  ..PIPE FLOW
  ..THREE DIMENSIONAL FLOW
  FLOW GEOMETRY
  FLOW VELOCITY
  FLUID DYNAMICS
  LAMINAR FLOW
  STEADY FLOW

RT
  GEOMETRY
  .EUCLIDEAN GEOMETRY
  ..POLYGONS
  ...TETRAGONS
  ...#PARALLELOGRAMS
  .....RHOMBOIDS

PARALLELOGRAMS
1902
GS
  GEOMETRY
  .EUCLIDEAN GEOMETRY
  ..POLYGONS
  ...TETRAGONS
  ...#PARALLELOGRAMS
  .....RHOMBOIDS

PARALLEL PLATES
0904 0905 1202 2304 2310 3203
RT CAPACITORS
% CHANNELS
  FLAT PLATES
  METAL PLATES
% PLATES
  THIN PLATES
  WAVEGUIDES

PARALLEL PROCESSING (COMPUTERS)
0802
GS
  DATA PROCESSING
  #PARALLEL PROCESSING (COMPUTERS)
  ASSOCIATIVE PROCESSING (COMPUTERS)
  CONCURRENT PROCESSING
  CONNECTION MACHINE
  HYPERCUBE MULTIPROCESSORS
  ILLIAC 3 COMPUTER
  ILLIAC 4 COMPUTER
  INTERPROCESSOR COMMUNICATION
  MASSIVELY PARALLEL PROCESSORS
  MIMD (COMPUTERS)
  SIMD (COMPUTERS)
  SUPERCOMPUTERS
  SYSTOLIC ARRAYS
  TRANSPUTERS
  VECTOR PROCESSING (COMPUTERS)

PARALLEL PROGRAMMING
0802
GS
  COMPUTER PROGRAMMING
  #PARALLEL PROGRAMMING
  MULTIPROCESSING (COMPUTERS)
  PIPELINING (COMPUTERS)

PARALLEL STRIP LINES
USE MICROSTRIP TRANSMISSION LINES

PARALLELEPIPEDS
1902
GS
  GEOMETRY

  .EUCLIDEAN GEOMETRY
  ..POLYHEDRONS
  ...#PARALLELEPIPEDS

PARALLELOGRAMS
1902
GS
  GEOMETRY
  .EUCLIDEAN GEOMETRY
  ..POLYGONS
  ...TETRAGONS
  ...#PARALLELOGRAMS
  .....RHOMBOIDS

PARALYSIS
0404 0405 0408
GS DISEASES
  #PARALYSIS
  INJURIES
  #PARALYSIS
  RT DISABILITIES
  TREMORS

PARAMAGNETIC AMPLIFIERS
USE MASERS

PARAMAGNETIC RESONANCE
2307 2311
GS
  MAGNETIC RESONANCE
  .#PARAMAGNETIC RESONANCE
  ...ELECTRON PARAMAGNETIC RESONANCE
  ABSORPTION SPECTRA
  FERROMAGNETIC RESONANCE
  NUCLEAR MAGNETIC RESONANCE
  PARAMAGNETISM

PARAMAGNETISM
2307 2311
GS
  MAGNETIC PROPERTIES
  #PARAMAGNETISM
  RT ANTIFERROMAGNETISM
  CURIE-WEISS LAW
  DIAMAGNETISM
  PARAMAGNETIC RESONANCE

PARAMECIA
0402 0407
GS
  ANIMALS
  .PROTOZOA
  .#PARAMECIA
  MICROORGANISMS
  .PROTOZOA
  .#PARAMECIA

PARAMETER IDENTIFICATION
1003
GS
  ESTIMATING
  #PARAMETER IDENTIFICATION
  IDENTIFYING
  #PARAMETER IDENTIFICATION
  PARAMETERIZATION
  #PARAMETER IDENTIFICATION
  COMPLEX SYSTEMS
  CONTROL SYSTEMS DESIGN
  DYNAMIC RESPONSE
  ESTIMATES
  GENETIC ALGORITHMS
  INDEPENDENT VARIABLES
  LEAST SQUARES METHOD
  MATHEMATICAL MODELS
  MAXIMUM LIKELIHOOD ESTIMATES
  OBSERVABILITY (SYSTEMS)
  OPTIMAL CONTROL
  OPTIMIZATION
  PREDICTION ANALYSIS TECHNIQUES
  PROBABILITY THEORY
  STATISTICAL ANALYSIS
  STEEPEST DESCENT METHOD
  SYSTEM IDENTIFICATION
  SYSTEMS ANALYSIS
  SYSTEMS ENGINEERING

PARAMETERIZATION
1902 1905
GS
  #PARAMETERIZATION
  .PARAMETER IDENTIFICATION
  RT ALGORITHMS
  % APPLICATIONS OF MATHEMATICS
  DEPENDENT VARIABLES
  DERIVATION
  DIMENSIONAL ANALYSIS
  % ESTIMATORS
  FORMALISM
  FORMULATIONS
  MATHEMATICAL MODELS
  SCALE EFFECT
  SEMIEMPIRICAL EQUATIONS
  SYSTEM IDENTIFICATION
  UNITS OF MEASUREMENT

PARAMETERS
USE INDEPENDENT VARIABLES

PARAMETRIC AMPLIFIERS
0701 0905 1201
UF
  PARAMETRIC OSCILLATORS
  REACTANCE AMPLIFIERS
  GS
  AMPLIFIERS
  #PARAMETRIC AMPLIFIERS
  RT
  FREQUENCY CONVERTERS

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[illegible]

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

...NEUTRON BEAMS  
 ...NEUTRINO BEAMS  
 ...PION BEAMS  
 ...PROTON BEAMS  
 BEAM SPLITTERS  
 ELECTRON ACCELERATION  
 ELECTRON BOMBARDMENT  
 FLUX (RATE)  
 ION STRIPPING  
 PHONON BEAMS

RT

PARTICLE CHARGING  
 1804 2304 2403  
 RT CHARGED PARTICLES

PARTICLE COLLISIONS  
 1203 2202 2403 2405  
 GS COLLISIONS

RT  
 #PARTICLE COLLISIONS  
 ATOMIC COLLISIONS  
 ATOMIC EXCITATIONS  
 BGK MODEL  
 DENSE PLASMAS  
 FADDEEV EQUATIONS  
 IONIC COLLISIONS  
 KINETICS  
 MEAN FREE PATH  
 MOLECULAR COLLISIONS  
 MOLECULAR EXCITATION  
 NUCLEON-NUCLEON SCATTERING  
 SCATTERING

PARTICLE COUNTERS  
 USE RADIATION COUNTERS

PARTICLE DECAY  
 USE RADIOACTIVE DECAY

PARTICLE DENSITY (CONCENTRATION)  
 2901 2902 2903  
 GS DENSITY (NUMBER/VOLUME)  
 #PARTICLE DENSITY (CONCENTRATION)  
 ...ELECTRON DENSITY (CONCENTRATION)  
 ...CARRIER DENSITY (SOLID STATE)  
 ...ELECTRON DENSITY PROFILES  
 ...IONOSPHERIC ELECTRON DENSITY  
 ...MAGNETOSPHERIC ELECTRON DENSITY  
 ...ELECTRON DISTRIBUTION  
 ...ELECTRON DENSITY PROFILES  
 ...ION DENSITY (CONCENTRATION)  
 ...IONOSPHERIC ION DENSITY  
 ...MAGNETOSPHERIC ION DENSITY  
 ...MAGNETOSPHERIC PROTON DENSITY  
 ...PROTON DENSITY (CONCENTRATION)  
 ....MAGNETOSPHERIC PROTON DENSITY

RT  
 ...PLASMA DENSITY  
 ...ATMOSPHERIC DENSITY  
 ESRO 4 SATELLITE  
 ION STRIPPING  
 IONOSPHERIC COMPOSITION  
 SPACE DENSITY  
 SPATIAL DISTRIBUTION

PARTICLE DETECTORS  
 USE RADIATION COUNTERS

PARTICLE DIFFUSION  
 1203 2403 2405  
 GS DIFFUSION  
 #PARTICLE DIFFUSION  
 ...ELECTRON DIFFUSION  
 ...IONIC DIFFUSION  
 ATOMIC BEAMS  
 BOLTZMANN TRANSPORT EQUATION  
 DIFFUSION COEFFICIENT  
 DIFFUSION LENGTH  
 DROP SIZE  
 FLUX (RATE)  
 GASEOUS SELF-DIFFUSION  
 MOLECULAR DIFFUSION  
 MUON SPIN ROTATION  
 SELF DIFFUSION (SOLID STATE)  
 THERMOPHORESIS

PARTICLE EMISSION  
 2402 2403 2406 2502  
 GS EMISSION  
 #PARTICLE EMISSION  
 ...ELECTRON EMISSION  
 ...FIELD EMISSION  
 ...PHOTOELECTRIC EMISSION  
 ...SECONDARY EMISSION  
 ...ION EMISSION  
 ...NEUTRON EMISSION  
 ...THERMIONIC EMISSION  
 EXHAUST EMISSION  
 EXPULSION  
 SELF SUSTAINED EMISSION  
 STIMULATED EMISSION

PARTICLE ENERGY  
 2401  
 GS #PARTICLE ENERGY  
 ...ELECTRON ENERGY  
 ...ELECTRON STATES  
 ...PROTON ENERGY  
 ENERGY  
 INTERNAL ENERGY  
 KINETIC ENERGY  
 MONOCHROMATIZATION

RT %

% PARTICLE INTENSITY

PARTICLE FLUX  
 USE FLUX (RATE)

PARTICLE FLUX DENSITY  
 2311 2401 3009  
 SN (LIMITED TO PARTICLE EMISSION OR  
 DETECTION RATE PER UNIT AREA)  
 GS RATES (PER TIME)  
 .FLUX DENSITY  
 ...RADIANT FLUX DENSITY  
 ...#PARTICLE FLUX DENSITY  
 ...ELECTRON FLUX DENSITY  
 ...NEUTRON FLUX DENSITY  
 ...PROTON FLUX DENSITY  
 ...HELIOS SATELLITES

RT % PARTICLE INTENSITY

RADIANCE  
 RADIATION COUNTERS  
 RADIATION PRESSURE  
 SOLAR CONSTANT  
 SOLAR FLUX DENSITY

PARTICLE IMAGE DISPLACEMENT VELOCIMETRY  
 USE PARTICLE IMAGE VELOCIMETRY

PARTICLE IMAGE VELOCIMETRY

1406  
 UF PARTICLE IMAGE DISPLACEMENT  
 VELOCIMETRY

GS PIV (VELOCIMETRY)  
 PIV (VELOCIMETRY)  
 MECHANICAL MEASUREMENT  
 .FLOW MEASUREMENT  
 #PARTICLE IMAGE VELOCIMETRY  
 .VELOCITY MEASUREMENT

RT #PARTICLE IMAGE VELOCIMETRY  
 FLOW DISTRIBUTION  
 FLOW VELOCITY  
 FLOW VISUALIZATION  
 IMAGING TECHNIQUES  
 LASER DOPPLER VELOCIMETERS  
 PHOTOGRAPHIC MEASUREMENT  
 PHOTOGRAPHIC RECORDING  
 TWO PHASE FLOW

PARTICLE IN CELL TECHNIQUE  
 1902 2403 3501  
 GS ANALYSIS (MATHEMATICS)  
 .ANALYSIS  
 .NUMERICAL ANALYSIS  
 ...APPROXIMATION  
 ...#PARTICLE IN CELL TECHNIQUE  
 RT % CELLS  
 CRYSTAL LATTICES

FLOW EQUATIONS  
% METHODOLOGY  
VORTEX IN CELL TECHNIQUE

JET FLOW  
PARTICLES  
TURBULENT FLOW

SIZE DISTRIBUTION  
#PARTICLE SIZE DISTRIBUTION  
DIMENSIONS  
DROP SIZE

% PARTICLE INTENSITY  
2202 2307 2403 3009  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT PARTICLE ENERGY  
PARTICLE FLUX DENSITY

|               |                   |
|---------------|-------------------|
| PARTICLE MASS | 2202 2403 2405    |
| GS            | MASS              |
|               | #PARTICLE MASS    |
|               | ..ELECTRON MASS   |
| RT            | GRAVITINOS        |
|               | MAGNETIC RIGIDITY |
|               | NUCLIDES          |

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PARTICLE INTERACTIONS
2311 2404 2405 3009
GS #PARTICLE INTERACTIONS
..ELEMENTARY PARTICLE INTERACTIONS
..HIGH ENERGY INTERACTIONS
...STRONG INTERACTIONS (FIELD
    THEORY)
...MESON-MESON INTERACTIONS
...MESON-NUCLEON INTERACTIONS
...NUCLEAR CAPTURE
...ELECTRON CAPTURE
...NUCLEON-NUCLEON INTERACTIONS
...WEAK ENERGY INTERACTIONS
...WEAK INTERACTIONS (FIELD THEORY)

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PARTICLE MOTION  
2202 2307 2308 2403  
DIFFRACTION RADIATION  
RT  
ELECTROPHORESIS  
FALLING  
LATTICE VIBRATIONS  
MAGNETIC RIGIDITY  
MEAN FREE PATH  
% MOTION  
NEUTRAL SHEETS  
PHOTOPHORESIS  
RECOILINGS  
RELATIVISTIC VELOCITY  
SETTLING  
THERMOPHORESIS

|                        |                         |
|------------------------|-------------------------|
| PARTICLE PRECIPITATION |                         |
| 2402                   |                         |
| GS                     | #PARTICLE PRECIPITATION |
|                        | .ELECTRON PRECIPITATION |
|                        | .PROTON PRECIPITATION   |
| RT                     | ATOMIC STRUCTURE        |
|                        | CHARGED PARTICLES       |
|                        | % PRECIPITATION         |

BRAGG CURVE  
CHARM (PARTICLE PHYSICS)  
CHEMICAL REACTIONS  
COLLISION PARAMETERS  
ELECTRON PHOTON INTERACTIONS  
ELECTRON SCATTERING  
FEYNMAN DIAGRAMS  
FLAVOR (PARTICLE PHYSICS)  
% INTERACTIONS  
NEUTRAL CURRENTS  
NUCLEAR REACTIONS  
PHOTONUCLEAR REACTIONS  
PHOTOPHORESIS  
QUANTUM CHROMODYNAMICS

PARTICLE PRODUCTION  
2202 2203 2403 3009  
GS #PARTICLE PRODUCTION  
    .KAON PRODUCTION  
    .PAIR PRODUCTION  
    .PHOTO PRODUCTION  
RT COMMINUTION  
CORPUSCULAR RADIATION  
HIGH ENERGY INTERACTIONS  
NUCLEAR RADIATION  
NUCLEAR REACTIONS  
PARTICLES  
RADIOACTIVITY  
SPALLATION

PARTICLE LADEN JETS  
O101  
RT FUEL FLOW

PARTICLE SIZE DISTRIBUTION  
2403 2405 2502

PARTICLE THEORY  
2202 2403 2405  
RT BODY KINEMATICS

PART II  
QUENCHING (ATOMIC PHYSICS)  
SPIN RESONANCE

PARTICLE SPIN  
2405  
GS SPIN



# NASA THESAURUS HIERARCHICAL UPDATE

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CHARM (PARTICLE PHYSICS)
COLLISION PARAMETERS
FLAVOR (PARTICLE PHYSICS)
GRAND UNIFIED THEORY
% INTERACTIONS
  MANY BODY PROBLEM
  PLASMA-PARTICLE INTERACTIONS
  QUARK MODELS
  STRING THEORY
  SUPERGRAVITY
  SUPERSYMMETRY
% THEORIES
  UNIFIED FIELD THEORY
  WEAK ENERGY INTERACTIONS

PARTICLE TRACKS
  2401 2403 1804
  RT
    CHEMICAL ANALYSIS
    CORE SAMPLING
    COSMIC RAYS
    FOSSILS
    GEOCHRONOLOGY
    LUNAR ROCKS
    METEORIDS
    NUCLEAR PARTICLES
    RADIATION EFFECTS
    STRATIGRAPHY
    TRACE ELEMENTS
    % TRACKS

PARTICLE TRAJECTORIES
  2401 2403
  GS
    TRAJECTORIES
    #PARTICLE TRAJECTORIES
    ..ELECTRON TRAJECTORIES
    RT
      BUBBLE CHAMBERS
      CHARGED PARTICLES
      ELECTRON OPTICS
      IONIZING RADIATION
      % MOTION
      % PATHS
      RACETRACKS (PARTICLE ACCELERATORS)
      % TRACKS

PARTICLES
  1503 1506 1703 1805 1901 2403
  GS
    #PARTICLES
    .AEROSOLS
    ..FOG
    .CHARGED PARTICLES
    ..ANTIPROTONS
    ..ENERGETIC PARTICLES
    ....ELECTRONS
    ....CONDUCTION ELECTRONS
    ....HIGH ENERGY ELECTRONS

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....HOT ELECTRONS
....N ELECTRONS
....NEGATONS
....PI-ELECTRONS
....NUCLEI (NUCLEAR PHYSICS)
....EVEN-EVEN NUCLEI
....HEAVY NUCLEI
....HYPERNUCLEI
....ODD-EVEN NUCLEI
....ODD-ODD NUCLEI
....PLASMAS (PHYSICS)
....ARGON PLASMA
....BETA PARTICLES
....BOUNDARY LAYER PLASMAS
....COLD PLASMAS
....COLLISIONAL PLASMAS
....STRONGLY COUPLED PLASMAS
....COLLISIONLESS PLASMAS
....COSMIC PLASMA
....CYLINDRICAL PLASMAS
....DENSE PLASMAS
....PLASMA FOCUS
....STRONGLY COUPLED PLASMAS
....ELECTRON PLASMA
....ELECTRON-POSITRON PLASMAS
....ELLIPTICAL PLASMAS
....HELIUM PLASMA
....HIGH TEMPERATURE PLASMAS
....HYDROGEN PLASMA
....DEUTERIUM PLASMA
....LASER PLASMAS
....METALLIC PLASMAS
....CESIUM PLASMA
....MICROPLASMAS
....NITROGEN PLASMA
....NONEQUILIBRIUM PLASMAS
....NONUNIFORM PLASMAS
....OXYGEN PLASMA
....RAREFIED PLASMAS
....RELATIVISTIC PLASMAS
....ROTATING PLASMAS
....SEMICONDUCTOR PLASMAS
....SPACE PLASMAS
....SOLAR WIND
....STELLAR WINDS
....SPHERICAL PLASMAS
....THERMAL PLASMAS
....TOROIDAL PLASMAS
....IONIZED GASES
....LORENTZ GAS
....MAGNETICALLY TRAPPED PARTICLES
....RADIATION BELTS
....ARTIFICIAL RADIATION BELTS
....INNER RADIATION BELT
....OUTER RADIATION BELT

....PROTON BELTS
....PARTONS
....PLASMA CLOUDS
....MAGNETIC CLOUDS
....PLASMA JETS
....RADIO JETS (ASTRONOMY)
....PLASMA LAYERS
....PLASMA SHEATHS
....PLASMA SLABS
....POSITRONS
....PROTONS
....RECOIL PROTONS
....SOLAR PROTONS
....CORPUSCULAR RADIATION
....ELECTRON PRECIPITATION
....ELECTRON RADIATION
....BETA PARTICLES
....ELECTRON BEAMS
....RELATIVISTIC ELECTRON BEAMS
....PRIMARY COSMIC RAYS
....SOLAR COSMIC RAYS
....RADIATION BELTS
....SOLAR CORPUSCULAR RADIATION
....SOLAR ELECTRONS
....SOLAR NEUTRONS
....SOLAR PROTONS
....DROPS (LIQUIDS)
....RAINDROPS
....DUST
....COSMIC DUST
....INTERPLANETARY DUST
....METEOROID DUST CLOUDS
....ZODIACAL DUST
....LUNAR DUST
....TERRESTRIAL DUST BELT
....ELEMENTARY PARTICLES
....ANTIPARTICLES
....ANTINEUTRONS
....ANTINUCLEONS
....ANTIPROTONS
....POSITRONS
....BETA PARTICLES
....BOSONS
....ALPHA PARTICLES
....MESONS
....ETA-MESONS
....KAONS
....MESON RESONANCE
....X MESONS
....MUONS
....PIONS
....VECTOR MESONS
....RHO-MESONS
....SIGMA-MESONS
....PHOTONS

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|                             |                                   |                             |                                    |
|-----------------------------|-----------------------------------|-----------------------------|------------------------------------|
| ...XI HYPERONS              | ...GRAVITINOS                     | ...NEUTRONS                 | ...GAS ATOMIZATION                 |
| ...DEUTERONS                | ...NEUTRONS                       | ...COLD NEUTRONS            | % GRAINS                           |
| ...ELECTRON-POSITRON PAIRS  | ...FAST NEUTRONS                  | ...PHOTONEUTRONS            | GRANULAR MATERIALS                 |
| ...FERMIONS                 | ...SOLAR NEUTRONS                 | ...THERMAL NEUTRONS         | GRIT                               |
| ...BARYONS                  | ...NUCLEAR PARTICLES              | ...ANTIPARTICLES            | ION STRIPPING                      |
| ...HYPERONS                 | ...ANTINEUTRONS                   | ...ANTINUCLEONS             | IONS                               |
| ...XI HYPERONS              | ...ANTIPROTONS                    | ...POSITRONS                | NEUTRAL BEAMS                      |
| ...OMEGA-MESONS             | ...BETA PARTICLES                 | ...MUONS                    | NEUTRON BEAMS                      |
| ...RHO-MESONS               | ...ALPHA PARTICLES                | ...ETA-MESONS               | NODULES                            |
| ...SIGMA-MESONS             | ...MESONS                         | ...KAONS                    | NONPOINT SOURCES                   |
| ...ETA-MESONS               | ...X MESONS                       | ...MUONS                    | PARTICLE LADEN JETS                |
| ...LEPTONS                  | ...PIONS                          | ...VECTOR MESONS            | PARTICLE PRODUCTION                |
| ...ANTINEUTRINOS            | ...RHO-MESONS                     | ...SIGMA-MESONS             | PARTICLE SIZE DISTRIBUTION         |
| ...MUONS                    | ...PHOTONS                        | ...XI HYPERONS              | POSITRON ANNIHILATION              |
| ...NEUTRINOS                | ...NUCLEONS                       | ...PHOTOELECTRONS           | PRECIPITATION PARTICLE MEASUREMENT |
| ...SOLAR NEUTRINOS          | ...PARTICULATES                   | ...SOOT                     | PROTON PRECIPITATION               |
| ...MESON RESONANCE          | ...SMOKE                          | ...POLLEN                   | SMOKE                              |
| ...NEUTRONS                 | ...POWDER (PARTICLES)             | ...FINES                    | PARTICULATE FILTERS                |
| ...COLD NEUTRONS            | ...METAL POWDER                   | ...PLATINUM BLACK           | USE FLUID FILTERS                  |
| ...FAST NEUTRONS            | ...POWDERED ALUMINUM              | ...SINTERED ALUMINUM POWDER | PARTICULATE REINFORCED COMPOSITES  |
| ...PHOTONEUTRONS            | ...RELATIVISTIC PARTICLES         | ...TRAPPED PARTICLES        | 3202                               |
| ...SOLAR NEUTRONS           | ...MAGNETICALLY TRAPPED PARTICLES | ...RADIATION BELTS          | GS                                 |
| ...THERMAL NEUTRONS         | ...ARTIFICIAL RADIATION BELTS     | ...INNER RADIATION BELT     | COMPOSITE MATERIALS                |
| ...PROTONS                  | ...PROTON BELTS                   | ...CHEMICAL CLOUDS          | #PARTICULATE REINFORCED COMPOSITES |
| ...RECOIL PROTONS           | ...AIR POLLUTION                  | ...CLOUDS                   | RT                                 |
| ...SOLAR PROTONS            | ...CHEMICAL CLOUDS                | ...COLLOIDS                 | METAL MATRIX COMPOSITES            |
| ...GLUONS                   | ...DEUTERON IRRADIATION           | ...DIRT                     | METAL PARTICLES                    |
| ...GRAVITONS                | ...DISPERSIONS                    |                             | MICROPARTICLES                     |
| ...HADRONS                  |                                   |                             | PARTICULATES                       |
| ...BARYONS                  |                                   |                             | REINFORCING MATERIALS              |
| ...OMEGA-MESONS             |                                   |                             | PARTICULATE SAMPLING               |
| ...RHO-MESONS               |                                   |                             | O601 O602 O603                     |
| ...SIGMA-MESONS             |                                   |                             | GS                                 |
| ...MESONS                   |                                   |                             | #PARTICULATE SAMPLING              |
| ...KAONS                    |                                   |                             | RT                                 |
| ...MUONS                    |                                   |                             | ASSAYING                           |
| ...OMEGA-MESONS             |                                   |                             | CHEMICAL ANALYSIS                  |
| ...VECTOR MESONS            |                                   |                             | CONCENTRATION (COMPOSITION)        |
| ...RHO-MESONS               |                                   |                             | IDENTIFYING                        |
| ...SIGMA-MESONS             |                                   |                             | PARTICULATES                       |
| ...MAGNETIC MONOPOLES       |                                   |                             | PARTICULATES                       |
| ...NUCLEONS                 |                                   |                             | O601                               |
| ...PARTONS                  |                                   |                             | GS                                 |
| ...QUARKS                   |                                   |                             | PARTICLES                          |
| ...TACHYONS                 |                                   |                             | #PARTICULATES                      |
| ...FLAKES                   |                                   |                             | ..SOOT                             |
| ...METAL PARTICLES          |                                   |                             | AEROSOLS                           |
| ...METAL POWDER             |                                   |                             | AIR POLLUTION                      |
| ...PLATINUM BLACK           |                                   |                             | AIR QUALITY                        |
| ...POWDERED ALUMINUM        |                                   |                             | AIR SAMPLING                       |
| ...SINTERED ALUMINUM POWDER |                                   |                             | ATMOSPHERIC COMPOSITION            |
| ...MICROPARTICLES           |                                   |                             | COMBUSTION PRODUCTS                |
| ...MIST                     |                                   |                             | CONTAMINANTS                       |
| ...NEUTRAL PARTICLES        |                                   |                             | DISPERSIONS                        |
|                             |                                   |                             | DUST                               |

# NASA THESAURUS HIERARCHICAL UPDATE

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EXHAUST GASES
FLY ASH
PARTICLE SIZE DISTRIBUTION
PARTICULATE REINFORCED COMPOSITES
PARTICULATE SAMPLING
POLLUTION CONTROL
POLLUTION MONITORING
SMOG
SMOKE
SOLID SUSPENSIONS

% PARTITIONS
0202 1504 1902 2311 2806 3203 3406
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT CURTAINS
PARTITIONS (MATHEMATICS)
PARTITIONS (STRUCTURES)
SEPTUM

PARTITIONS (MATHEMATICS)
1902
GS ANALYSIS (MATHEMATICS)
.COMBINATORIAL ANALYSIS
.#PARTITIONS (MATHEMATICS)
RT COMBINATIONS (MATHEMATICS)
EQUIVALENCE
% PARTITIONS
PERMUTATIONS

PARTITIONS (STRUCTURES)
3202
RT BULKHEADS
CURTAINS
% PARTITIONS
THIN WALLS
WALLS

PARTONS
2401 2403 2405
GS PARTICLES
.CHARGED PARTICLES
.#PARTONS
.ELEMENTARY PARTICLES
.#PARTONS
HADRONS
LEPTONS
QUARK PARTON MODEL
QUARKS

RT
PARTS
USE COMPONENTS
PAS

3107
UF PERIGEE-APOGEE SATELLITES
GS ARTIFICIAL SATELLITES
#PAS
RT ELLIPTICAL ORBITS
TWENTY-FOUR HOUR ORBITS

PASCAL (PROGRAMMING LANGUAGE)
0802
GS LANGUAGES
.PROGRAMMING LANGUAGES
.#PASCAL (PROGRAMMING LANGUAGE)
RT COMPILERS
COMPUTER PROGRAMMING

PASCHEN SERIES
1411 2401 2402 3009
GS SPECTRA
.RADIATION SPECTRA
..ELECTROMAGNETIC SPECTRA
...LINE SPECTRA
...#PASCHEN SERIES
RT ABSORPTION SPECTRA
ATOMIC SPECTRA
ELECTRON TRANSITIONS
EMISSION SPECTRA
H LINES
HYDROGEN

PASSAGEWAYS
1101 1102 1105 1106 1504 3203
GS #PASSAGEWAYS
.STRAITS
..TORRES STRAIT
.TRANSFER TUNNELS
RT APPROACH
CAVITIES
CORRIDORS
GAPS
NOTCHES
OPENINGS
% PATHS
ROADS
% TUNNELS
UNDERGROUND STRUCTURES
VESTIBULES

PASSENGER AIRCRAFT
0201 0204 0205
UF EXECUTIVE AIRCRAFT
GS #PASSENGER AIRCRAFT
.BAC 111 AIRCRAFT
.B0-105 HELICOPTER
.BOEING 707 AIRCRAFT
.BOEING 720 AIRCRAFT

BOEING 727 AIRCRAFT
BOEING 737 AIRCRAFT
BOEING 747 AIRCRAFT
BOEING 757 AIRCRAFT
BOEING 767 AIRCRAFT
BOEING 7707 AIRCRAFT
BREGUET 941 AIRCRAFT
C-33 AIRCRAFT
C-35 AIRCRAFT
C-46 AIRCRAFT
CESSNA 172 AIRCRAFT
CESSNA 205 AIRCRAFT
CESSNA 210 AIRCRAFT
CESSNA 402B AIRCRAFT
CH-3 HELICOPTER
CH-46 HELICOPTER
CH-47 HELICOPTER
CH-54 HELICOPTER
COMET 4 AIRCRAFT
COMMUTER AIRCRAFT
CV-340 AIRCRAFT
CV-440 AIRCRAFT
CV-880 AIRCRAFT
CV-990 AIRCRAFT
DC 8 AIRCRAFT
DC 10 AIRCRAFT
DH 121 AIRCRAFT
DH 125 AIRCRAFT
DO-27 AIRCRAFT
DO-28 AIRCRAFT
ELECTRA AIRCRAFT
EUROPEAN AIRBUS
.A-300 AIRCRAFT
.A-310 AIRCRAFT
.A-320 AIRCRAFT
F-27 AIRCRAFT
F-28 HELICOPTER
F-28 TRANSPORT AIRCRAFT
G-1 AIRCRAFT
G-222 AIRCRAFT
H-19 HELICOPTER
H-53 HELICOPTER
H-56 HELICOPTER
HFB-320 AIRCRAFT
HS-748 AIRCRAFT
IL-62 AIRCRAFT
JETSTREAM AIRCRAFT
L-1011 AIRCRAFT
L-2000 AIRCRAFT
MYSTERE 20 AIRCRAFT
OH-5 HELICOPTER
P-160 AIRCRAFT
P-166 AIRCRAFT
SE-210 AIRCRAFT
T-39 AIRCRAFT

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|            |                                     |                                   |                                     |
|------------|-------------------------------------|-----------------------------------|-------------------------------------|
| RT         | .TU-104 AIRCRAFT                    | PASSES                            | % INHIBITION                        |
|            | .TU-124 AIRCRAFT                    | USE GAPS (GEOLOGY)                | INHIBITORS                          |
|            | .TU-134 AIRCRAFT                    |                                   | OXIDATION                           |
|            | .TU-144 AIRCRAFT                    | PASSIVATION                       | OXIDATION RESISTANCE                |
|            | .U-10 AIRCRAFT                      | USE PASSIVITY                     | RUSTING                             |
|            | .VC-10 AIRCRAFT                     |                                   | SILICONIZING                        |
|            | .VISCOUNT AIRCRAFT                  |                                   |                                     |
|            | .YAK 40 AIRCRAFT                    | PASSIVE ELEMENTS                  | PASTE (CONSISTENCY)                 |
|            | .YS-11 AIRCRAFT                     | USE PARASITIC ELEMENTS (ANTENNAS) | 1805                                |
|            | AIR TRANSPORTATION                  |                                   | RT MIXTURES                         |
| %          | AIRCRAFT                            |                                   |                                     |
|            | AN-22 AIRCRAFT                      | PASSIVE L-BAND RADIOMETERS        | PASTES                              |
|            | AN-24 AIRCRAFT                      | 1404 1406 1407 1409 2402          | O403 1805 3404                      |
|            | CARGO AIRCRAFT                      | GS MEASURING INSTRUMENTS          | GS ADHESIVES                        |
|            | CIVIL AVIATION                      | .RADIATION MEASURING INSTRUMENTS  | #PASTES                             |
|            | COMMERCIAL AIRCRAFT                 | ..ACTINOMETERS                    | RT GLUES                            |
|            | DC 7 AIRCRAFT                       | ...RADIOMETERS                    | PLASTERS                            |
|            | E-2 AIRCRAFT                        | ...#PASSIVE L-BAND RADIOMETERS    |                                     |
|            | GENERAL AVIATION AIRCRAFT           | RT MICROWAVE FREQUENCIES          | PASTEURIZING                        |
|            | GROUND EFFECT MACHINES              | ULTRAHIGH FREQUENCIES             | O505 O602 3404                      |
|            | HC-3 HELICOPTER                     |                                   | GS HEATING                          |
|            | JET AIRCRAFT                        | PASSIVE NOSETIP TECHNOLOGY        | #PASTEURIZING                       |
|            | LIGHT AIRCRAFT                      | USE PANT PROGRAM                  | RT PURIFICATION                     |
|            | LIGHT TRANSPORT AIRCRAFT            |                                   | STERILIZATION                       |
| %          | LOW WING AIRCRAFT                   | PASSIVE SATELLITES                |                                     |
|            | MERCURE AIRCRAFT                    | O706 3107 3502                    | PATCH TESTS                         |
|            | MH-262 AIRCRAFT                     | UF REFLECTOR SATELLITES           | O405 O408                           |
| %          | MILITARY AIRCRAFT                   | GS ARTIFICIAL SATELLITES          | SN (CONDITIONS FOR ASSESSING FINITE |
|            | MYSTERE 50 AIRCRAFT                 | #PASSIVE SATELLITES               | ELEMENT METHOD CONVERGENCE AND      |
|            | P-531 HELICOPTER                    | ..BEACON SATELLITES               | STABILITY PROPERTIES)               |
|            | PD-808 AIRCRAFT                     | ...BEACON EXPLORER A              | CONVERGENCE                         |
|            | ROTARY WING AIRCRAFT                | ...EXPLORER 22 SATELLITE          | FINITE ELEMENT METHOD               |
|            | SAAB 105 AIRCRAFT                   | ..ECHO SATELLITES                 | HYDRAULIC FLUIDS                    |
|            | SC-7 AIRCRAFT                       | ...ECHO 1 SATELLITE               | STRUCTURAL ANALYSIS                 |
| %          | SHORT HAUL AIRCRAFT                 | ...ECHO 2 SATELLITE               | % TESTS                             |
|            | SUBSONIC AIRCRAFT                   | ..LAGEOS (SATELLITE)              |                                     |
|            | SUPERSONIC AIRCRAFT                 | ..PAGEOS SATELLITE                | PATENT APPLICATIONS                 |
|            | SUPERSONIC TRANSPORTS               | RT ACTIVE SATELLITES              | 3403 3404                           |
|            | TRANSPORT AIRCRAFT                  | COMMUNICATION SATELLITES          | RT COPYRIGHTS                       |
|            | TU-154 AIRCRAFT                     | ECHO PROJECT                      | INVENTIONS                          |
|            | TURBOFAN AIRCRAFT                   | GEODETIC SATELLITES               | LICENSING                           |
|            | TURBOPROP AIRCRAFT                  | NAVIGATION SATELLITES             | PATENTS                             |
|            | V/STOL AIRCRAFT                     | SYNCHRONOUS SATELLITES            | PRODUCT DEVELOPMENT                 |
|            | WATER TAKEOFF AND LANDING AIRCRAFT  |                                   | TECHNOLOGY UTILIZATION              |
| PASSENGERS |                                     | PASSIVITY                         |                                     |
| O203       | O204 O502                           | O603 1703                         |                                     |
| RT         | AIRLINE OPERATIONS                  | UF PASSIVATION                    | PATENT POLICY                       |
|            | AUTOMATED GUIDEWAY TRANSIT VEHICLES | RT ANODIZING                      | 3401 3402 3403                      |
|            | AUTOMATED MIXED TRAFFIC VEHICLES    | CHEMICAL ATTACK                   | GS POLICIES                         |
|            | AUTOMATED TRANSIT VEHICLES          | CHEMICAL PROPERTIES               | #PATENT POLICY                      |
|            | PAYLOADS                            | COATINGS                          | RT INVENTIONS                       |
|            | RAPID TRANSIT SYSTEMS               | CORROSION                         | PATENTS                             |
|            | RIDING QUALITY                      | CORROSION PREVENTION              | PRODUCT DEVELOPMENT                 |
|            | TRANSPORTATION                      | CORROSION RESISTANCE              | REGULATIONS                         |
|            |                                     | DEACTIVATION                      | RULES                               |
|            |                                     | ELECTROLYSIS                      |                                     |

[illegible]

|                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                                                             | DIFFRACTION PATTERNS<br>DISTRIBUTION (PROPERTY)<br>DRAINAGE PATTERNS<br>KURTOSIS<br>MOLDS<br>PHOTOMASKS<br>PROTOTYPES<br>RADIATION DISTRIBUTION<br>REGULARITY<br>RESINS<br>SPECKLE PATTERNS<br>SYNTHETIC ARRAYS<br>TEMPLATES<br>TEST PATTERN GENERATORS<br>WIDMANSTATTEN STRUCTURE | SPACE TRANSPORTATION SYSTEM<br>SPACEBORNE EXPERIMENTS<br><br>PAYLOAD CONTROL<br>3401<br>RT % CONTROL<br>PAYLOADS<br>SOUNDING ROCKETS<br>SPACE SHUTTLES<br><br>PAYLOAD DELIVERY (STS)<br>3406<br>GS DELIVERY<br>#PAYLOAD DELIVERY (STS)<br>ADVANCED LAUNCH SYSTEM (STS)<br>ELECTRIC POWER SUPPLIES<br>ORBIT INSERTION<br>ORBIT TRANSFER VEHICLES<br>ORBITAL LAUNCHING<br>PAYLOADS<br>POWER MODULES (STS)<br>SOLAR ARRAYS<br>SPACE TRANSPORTATION SYSTEM<br><br>PAYLOAD DEPLOYMENT & RETRIEVAL SYSTEM<br>3401<br>GS #PAYLOAD DEPLOYMENT & RETRIEVAL<br>SYSTEM<br>.REMOTE MANIPULATOR SYSTEM<br>MANIPULATORS<br>NASA PROGRAMS<br>ORBIT TRANSFER VEHICLES<br>PAYLOADS<br>REMOTE HANDLING<br>SPACE SHUTTLES<br>% SYSTEMS<br><br>PAYLOAD INTEGRATION<br>3104<br>RT MISSION PLANNING<br>PAYLOAD INTEGRATION PLAN<br>PAYLOADS<br>SPACE SHUTTLE PAYLOADS<br><br>PAYLOAD INTEGRATION PLAN<br>3104<br>RT PAYLOAD INTEGRATION<br>PAYLOADS<br>% PLANS<br>SPACE SHUTTLE ORBITERS<br>SPACE SHUTTLE PAYLOADS<br>SPACE TRANSPORTATION SYSTEM<br>SPACEBORNE EXPERIMENTS<br><br>PAYLOAD MASS RATIO | 3110<br>GS RATIOS<br>.MASS RATIOS<br>.#PAYLOAD MASS RATIO<br>MULTISTAGE ROCKET VEHICLES<br>PIGGYBACK SYSTEMS<br>PRESSURE RATIO<br>PROPELLANT MASS RATIO<br><br>PAYLOAD RETRIEVAL (STS)<br>3401<br>GS RETRIEVAL<br>#PAYLOAD RETRIEVAL (STS)<br>ORBIT TRANSFER VEHICLES<br>ORBITAL RENDEZVOUS<br>PAYLOAD TRANSFER<br>REMOTE MANIPULATOR SYSTEM<br>SPACE SHUTTLES<br>SPACE TRANSPORTATION SYSTEM<br>STATIONKEEPING<br><br>PAYLOAD STATIONS<br>3109<br>SN (THE POSITION OR MOUNTING PLACE<br>FOR A PAYLOAD ONBOARD A ROCKET<br>VEHICLE, SPACECRAFT, OR SPACE<br>STATION; EXCLUDES ORBITAL STATIONS<br>AND CREW WORKSTATIONS)<br><br>GS STATIONS<br>#PAYLOAD STATIONS<br>RT PAYLOADS<br>SPACE TRANSPORTATION<br><br>PAYLOAD TRANSFER<br>0201<br>RT ORBITAL SERVICING<br>PAYLOAD RETRIEVAL (STS)<br>SPACE MAINTENANCE<br><br>PAYLOADS<br>0201 0202 3104 3110<br>GS #PAYLOADS<br>.EXPOS (SPACELAB PAYLOAD)<br>.OSTA-2 PAYLOAD<br>.SEPA (PAYLOAD)<br>.SHUTTLE IMAGING RADAR<br>.SORTIE SYSTEMS<br>.SPACE SHUTTLE PAYLOADS<br>..ADVANCED TECHNOLOGY LABORATORY<br>..ASTRO MISSIONS (STS)<br>..ATMOSPHERIC GENERAL CIRCULATION<br>EXPERIMENT<br>..EARTH RADIATION BUDGET EXPERIMENT<br>..EARTH VIEWING APPLICATIONS<br>LABORATORY |
| PATTERSON MAP<br>0710 2402 2406<br>GS CHARTS<br>.GRAPHS (CHARTS)<br>.#PATTERSON MAP<br>CRYSTAL LATTICES<br>CRYSTAL STRUCTURE<br>LATTICE PARAMETERS                                             |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PAULI EXCLUSION PRINCIPLE<br>2308 2401 2403<br>GS QUANTUM MECHANICS<br>#PAULI EXCLUSION PRINCIPLE<br>WAVE FUNCTIONS<br>#PAULI EXCLUSION PRINCIPLE<br>ATOMIC STRUCTURE<br>EXCLUSION<br>FERMIONS |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PAVEMENTS<br>1101 1108 3202 3203 3501<br>RT ASPHALT<br>COATINGS<br>CONCRETES<br>FOUNDATIONS<br>HIGHWAYS<br>ROADS<br>RUNWAYS<br>STREETS                                                         |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PAYLOAD ASSIST MODULE<br>1410<br>GS MODULES<br>#PAYLOAD ASSIST MODULE<br>ROCKET VEHICLES<br>#PAYLOAD ASSIST MODULE<br>INSTRUMENT PACKAGES<br>PAYLOADS<br>SPACE SHUTTLE PAYLOADS                |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                                                 |                                    |                              |
|-------------------------------------------------|------------------------------------|------------------------------|
| ..ELECTROMAGNETIC ENVIRONMENT<br>EXPERIMENT     | USE POLYBROMINATED BIPHENYLS       | .....PDP 7 COMPUTER          |
| ..GET AWAY SPECIALS (STS)                       | PBRE (REACTORS)                    | .....PDP 8 COMPUTER          |
| ..HALOGEN OCCULTATION EXPERIMENT                | USE PEBBLE BED REACTORS            | .....PDP 9 COMPUTER          |
| ..OSS-1 PAYLOAD                                 |                                    | .....PDP 10 COMPUTER         |
| ..OSTA-1 PAYLOAD                                | PCB                                | .....PDP 11 COMPUTER         |
| ..OSTA-3 PAYLOAD                                | USE POLYCHLORINATED BIPHENYLS      | .....PDP 11/20 COMPUTER      |
| ..PHYSICS AND CHEMISTRY EXPERIMENT              |                                    | .....PDP 11/40 COMPUTER      |
| IN SPACE                                        |                                    | .....PDP 11/45 COMPUTER      |
| ..PLASMA INTERACTION EXPERIMENT                 | PCM (MATERIALS)                    | .....PDP 11/50 COMPUTER      |
| ..SPACE LAB                                     | USE PHASE CHANGE MATERIALS         | .....PDP 11/70 COMPUTER      |
| ..SPACE STATION PAYLOADS                        |                                    | .....PDP 12 COMPUTER         |
| ..SPACE LAB PAYLOADS                            | PCM (MODULATION)                   |                              |
| ..AMPS (SATELLITE PAYLOAD)                      | USE PULSE CODE MODULATION          |                              |
| ..ATMOSPHERIC CLOUD PHYSICS LAB<br>(SPACE LAB)  | PCM TELEMETRY                      | PDP 7 COMPUTER               |
| ..ATMOSPHERIC GENERAL CIRCULATION<br>EXPERIMENT | Q702 Q708                          | O801 O802                    |
| ..GEOPHYSICAL FLUID FLOW CELLS                  | GS TELECOMMUNICATION               | GS DATA PROCESSING EQUIPMENT |
| ..SOLAR CELL CALIBRATION FACILITY               | .TELEMETRY                         | .COMPUTERS                   |
| AIRCRAFT PERFORMANCE                            | .#PCM TELEMETRY                    | ..DIGITAL COMPUTERS          |
| AIRCRAFT SPECIFICATIONS                         | TRANSMISSION                       | ...PDP COMPUTERS             |
| ANNUAL SUSPENSION AND POINTING<br>SYSTEM        | .SIGNAL TRANSMISSION               | ...#PDP 7 COMPUTER           |
| APOLLO LUNAR SURFACE EXPERIMENTS                | ..TELEMETRY                        | RT PDP 9 COMPUTER            |
| PACKAGE                                         | ..#PCM TELEMETRY                   |                              |
| ASTEROID CAPTURE                                | DIFFERENTIAL PULSE CODE MODULATION | PDP 8 COMPUTER               |
| EASEP                                           | PULSE CODE MODULATION              | O801 O802                    |
| GERMAN INFRARED LABORATORY                      | RT                                 | GS DATA PROCESSING EQUIPMENT |
| INSTRUMENT PACKAGES                             |                                    | .COMPUTERS                   |
| LIRTS (TELESCOPE)                               | PD-808 AIRCRAFT                    | ..DIGITAL COMPUTERS          |
| % LOADING                                       | O207                               | ...PDP COMPUTERS             |
| LOADS (FORCES)                                  | UF                                 | ...#PDP 8 COMPUTER           |
| PASSENGERS                                      | DOUGLAS PD-808 AIRCRAFT            |                              |
| PAYLOAD ASSIST MODULE                           | PIAGGIO-DOUGLAS PD-808 AIRCRAFT    |                              |
| PAYLOAD CONTROL                                 | JET AIRCRAFT                       | PDP 9 COMPUTER               |
| PAYLOAD DELIVERY (STS)                          | #PD-808 AIRCRAFT                   | O801 O802                    |
| PAYLOAD DEPLOYMENT & RETRIEVAL                  | LIGHT AIRCRAFT                     | GS DATA PROCESSING EQUIPMENT |
| SYSTEM                                          | #PD-808 AIRCRAFT                   | .COMPUTERS                   |
| PAYLOAD INTEGRATION                             | MCDONNELL DOUGLAS AIRCRAFT         | ..DIGITAL COMPUTERS          |
| PAYLOAD INTEGRATION PLAN                        | .DOUGLAS AIRCRAFT                  | ...PDP COMPUTERS             |
| PAYLOAD STATIONS                                | ..#PD-808 AIRCRAFT                 | ...#PDP 9 COMPUTER           |
| PIGgyBACK SYSTEMS                               | MONOPLANES                         | RT PDP 7 COMPUTER            |
| SPACE PROCESSING APPLICATIONS                   | #PD-808 AIRCRAFT                   |                              |
| ROCKET                                          | PIAGGIO AIRCRAFT                   | PDP 10 COMPUTER              |
| SPACE TRANSPORTATION                            | #PD-808 AIRCRAFT                   | O801 O802                    |
| SPACE TUGS                                      | #PD-808 AIRCRAFT                   | UF SYSTEM 10 COMPUTER        |
| SPACEBORNE EXPERIMENTS                          | UTILITY AIRCRAFT                   | GS DATA PROCESSING EQUIPMENT |
| VERTICAL 8 ROCKET                               | #PD-808 AIRCRAFT                   | .COMPUTERS                   |
| WARHEADS                                        | RT % AIRCRAFT                      | ..DIGITAL COMPUTERS          |
| % WEIGHT                                        | PASSENGER AIRCRAFT                 | ...PDP COMPUTERS             |
| WEIGHT (MASS)                                   |                                    | ...#PDP 10 COMPUTER          |
|                                                 | PDM (MODULATION)                   |                              |
|                                                 | USE PULSE DURATION MODULATION      |                              |
|                                                 |                                    | PDP 11 COMPUTER              |
|                                                 | PDP COMPUTERS                      | O801                         |
|                                                 | O801 O802                          | GS DATA PROCESSING EQUIPMENT |
|                                                 | GS DATA PROCESSING EQUIPMENT       | .COMPUTERS                   |
|                                                 | .COMPUTERS                         | ..DIGITAL COMPUTERS          |
|                                                 | ..DIGITAL COMPUTERS                | ...PDP COMPUTERS             |
|                                                 | ..#PDP COMPUTERS                   | ...#PDP 11 COMPUTER          |

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

## PEDIMENTS

USE PIEDMONTS

## PEDIPLAINS

USE PIEDMONTS

## PEDOLOGY

USE SOIL SCIENCE

## PEEK

1808 1809 1810

UF POLYETHERETHERKETONES

GS PLASTICS

.SYNTHETIC RESINS

..POLYETHER RESINS

..#PEEK

..THERMOPLASTIC RESINS

..#PEEK

RESINS

.SYNTHETIC RESINS

..POLYETHER RESINS

..#PEEK

..THERMOPLASTIC RESINS

..#PEEK

RT CARBON FIBER REINFORCED PLASTICS

ETHERS

KETONES

POLYMER MATRIX COMPOSITES

RESIN MATRIX COMPOSITES

## PEELING

1504 3407

RT ADHESION

CUTTING

DEBONDING (MATERIALS)

DELAMINATING

FLAKING

MECHANICAL PROPERTIES

SHEDDING

% STRIPPING

## PEENING

1504

GS

METAL FINISHING

#PEENING

..SHOT PEENING

COLD WORKING

HARDENING (MATERIALS)

METAL WORKING

WORK HARDENING

PEGASUS AIR-LAUNCHED BOOSTER

3103 3110

GS LAUNCH VEHICLES

#PEGASUS AIR-LAUNCHED BOOSTER

ROCKET VEHICLES

.MULTISTAGE ROCKET VEHICLES

..#PEGASUS AIR-LAUNCHED BOOSTER

RT AIR LAUNCHING

B-52 AIRCRAFT

PEGASUS COMPUTER

0801

GS DATA PROCESSING EQUIPMENT

.COMPUTERS

..#PEGASUS COMPUTER

PEGASUS ENGINE

USE BRISTOL-SIDDELEY BS 53 ENGINE

PEGASUS SATELLITES

3107

GS ARTIFICIAL SATELLITES

#PEGASUS SATELLITES

RT SATURN PROJECT

PELAGIC ZONE

1305

GS REGIONS

#PELAGIC ZONE

RT OCEANOGRAPHY

PELLETS

0505 0603 1502 1504 1704 1805 3203

RT BRIQUETS

FUEL CAPSULES

GRANULAR MATERIALS

NUCLEAR FUELS

% SHOT

PELLICLE

0404 0405

RT THIN FILMS

PELOMYXA

0402

GS

ANIMALS

.PROTOZOA

..AMOEB

..#PELOMYXA

MICROORGANISMS

.PROTOZOA

..AMOEB

..#PELOMYXA

PELTIER EFFECTS

1002 3303 3304 3501

RT % EFFECTS

SEEBECK EFFECT

TEMPERATURE EFFECTS

PELVIS

0402 0404

GS ANATOMY

.MUSCULOSKELETAL SYSTEM

..BONES

..#PELVIS

RT GIRDLES

PENALTIES

3403

GS

LAW (JURISPRUDENCE)

.PUBLIC LAW

..PENALTIES

RT AIR LAW

DISCIPLINING

JUDGMENTS

LEGAL LIABILITY

LIABILITIES

PROHIBITION

REGULATIONS

PENALTY FUNCTION

1902

GS FUNCTIONS (MATHEMATICS)

#PENALTY FUNCTION

RT CONSTRAINTS

% FUNCTIONS

MAXIMA

MINIMA

OPTIMIZATION

PENCIL BEAMS

2401 2403 2405

GS BEAMS (RADIATION)

#PENCIL BEAMS

RT ANTENNA DESIGN

ANTENNA RADIATION PATTERNS

RADAR BEAMS

PENDULOUS GYROSCOPES

USE GYROSCOPIC PENDULUMS

PENDULUMS

1403 1504 2308

GS OSCILLATORS

.MECHANICAL OSCILLATORS

..#PENDULUMS

..GYROSCOPIC PENDULUMS

ACCELEROMETERS

RT GRAVITATION

MOMENTUM  
 OSCILLATIONS  
 TIMING DEVICES  
 PENETRANTS  
 3201  
 RT % AGENTS  
 PRESERVATIVES  
 RETARDANTS  
 PENETRATING PARTICLES  
 USE CORPUSCULAR RADIATION  
 PENETRATION  
 3401 3407  
 RT DIFFUSION  
 DRILLING  
 FRAGMENTATION  
 HYDRODYNAMIC RAM EFFECT  
 IMPACT  
 NUCLEAR VULNERABILITY  
 PERCOLATION  
 PERFORATING  
 PERMEABILITY  
 PERMEATING  
 PIERCING  
 % SATURATION  
 SEEPAGE  
 TERMINAL BALLISTICS  
 VULNERABILITY  
 PENETRATION BALLISTICS  
 USE TERMINAL BALLISTICS  
 PENETROMETERS  
 1406 2402  
 GS MEASURING INSTRUMENTS  
 #PENETROMETERS  
 RT LUNAR SOIL  
 PENICILLIN  
 0403 0405 1808  
 GS DRUGS  
 .ANTIBIOTICS  
 .#PENICILLIN  
 PENINSULAR RANGES (CA)  
 1305 1306  
 GS LANDFORMS  
 .MOUNTAINS  
 .#PENINSULAR RANGES (CA)  
 RT CALIFORNIA  
 PENINSULAS  
 1305  
 GS LANDFORMS  
 .#PENINSULAS  
 .DELMARVA PENINSULA (DE-MD-VA)  
 RT ISTHMOSES  
 LAND  
 WATER  
 PENNING DISCHARGE  
 2402 2502  
 GS ELECTRIC CURRENT  
 .ELECTRIC DISCHARGE  
 .#PENNING DISCHARGE  
 ELECTRODELESS DISCHARGES  
 RT GAS IONIZATION  
 ION MOTION  
 PLASMA GENERATORS  
 PENNING EFFECT  
 2402 2502  
 RT % EFFECTS  
 GAS IONIZATION  
 METASTABLE ATOMS  
 PENNING GAGES  
 1406 2402 2502  
 GS MEASURING INSTRUMENTS  
 .PRESSURE GAGES  
 .VACUUM GAGES  
 ...IONIZATION GAGES  
 ...#PENNING GAGES  
 VACUUM APPARATUS  
 .VACUUM GAGES  
 ..IONIZATION GAGES  
 ..#PENNING GAGES  
 PENNSYLVANIA  
 1305  
 GS NATIONS  
 .UNITED STATES  
 .#PENNSYLVANIA  
 ALLEGHENY PLATEAU (US)  
 DELAWARE BAY (US)  
 DELAWARE RIVER BASIN (US)  
 OHIO RIVER (US)  
 SUSQUEHANNA RIVER BASIN (MD-NY-PA)  
 % PENS  
 1103  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 UF STYLUSES  
 RT ENCLOSURES  
 RECORDING INSTRUMENTS  
 PENTABORANES  
 1808  
 GS BORON COMPOUNDS  
 .BORON HYDRIDES  
 ..BORANES  
 ..#PENTABORANES  
 HYDROGEN COMPOUNDS  
 .HYDRIDES  
 ..BORON HYDRIDES  
 ...BORANES  
 ...#PENTABORANES  
 PENTACHLORIDES  
 USE CHLORIDES  
 PENTAERYTHRITOL TETRANITRATE  
 USE PETN  
 PENTANES  
 1808  
 GS ORGANIC COMPOUNDS  
 .HYDROCARBONS  
 ..ALIPHATIC HYDROCARBONS  
 ...ALKANES  
 ...#PENTANES  
 .....NEOPENTANE  
 PENTANONE  
 1808  
 GS KETONES  
 #PENTANONE  
 ORGANIC COMPOUNDS  
 #PENTANONE  
 RT ACETONE  
 ACETYLACETONE  
 PENTOBARBITAL  
 0403 0405 1808  
 RT DRUGS  
 NARCOTICS  
 SEDATIVES  
 PENTOBARBITAL SODIUM  
 0603 1808  
 GS DRUGS  
 #PENTOBARBITAL SODIUM  
 ..RESERPINE  
 RT NEMBUTAL (TRADEMARK)  
 PENTODES  
 0903 0905  
 RT ELECTRON TUBES  
 SEMICONDUCTOR DEVICES  
 TETRODES  
 TRANSISTORS

# NASA THESAURUS HIERARCHICAL UPDATE

## VACUUM TUBES

### PENTOLITE

1808 3302  
GS EXPLOSIVES  
#PENTOLITE  
PROPELLANTS  
#PENTOLITE

### PENTOSE

1808  
GS ORGANIC COMPOUNDS  
.CARBOHYDRATES  
...SUGARS  
...MONOSACCHARIDES  
...#PENTOSE  
.....RIBOSE  
.....XYLOSE

### PENUMBRAS

1902 2306 2310 3001  
GS SHADOWS  
#PENUMBRAS  
RT ECLIPSES  
UMBRAS

### PEOPLE SATELLITES

3107  
GS ARTIFICIAL SATELLITES  
.FRENCH SATELLITES  
#PEOPLE SATELLITES  
RT GEOPHYSICAL SATELLITES

### PEOPLES DEMOCRATIC REPUBLIC OF GERMANY

USE EAST GERMANY

### PEPPERS

0409 0505  
RT % FOOD

### PEPSIN

0403 1808  
GS BIOPOLYMERS  
.PROTEINS  
...ENZYMES  
...#PEPSIN  
ORGANIC COMPOUNDS  
.PROTEINS  
...ENZYMES  
...#PEPSIN  
RT PAPAINE

### PEPTIDES

0403 0404 1808  
GS ORGANIC COMPOUNDS

## #PEPTIDES

...POLYPEPTIDES  
...GLUTATHIONE  
...HYPERTENSIN  
AMINO ACIDS  
ASPARTIC ACID  
PROTEINS

RT

## PERCENTAGE

USE RATIOS

## PERCEPTION

0404 0408 0503 1409 3407 3408  
GS #PERCEPTION  
...BINAURAL HEARING  
...MOTION PERCEPTION  
...SENSORY PERCEPTION  
...AUDITORY PERCEPTION  
...CONSCIOUSNESS  
...EXTRASENSORY PERCEPTION  
...KINESTHESIA  
...OLFACTORY PERCEPTION  
...PAIN  
...PAIN SENSITIVITY  
...PROPRIOCEPTION  
...AUTOKINESIS  
...TASTE  
...TOUCH  
...TACTILE DISCRIMINATION  
...VERTICAL PERCEPTION  
...VIBRATION PERCEPTION  
...VISUAL PERCEPTION  
...CRITICAL FLICKER FUSION  
...SPACE PERCEPTION  
...AUTOKINESIS  
...VISUAL DISCRIMINATION  
...SOUND LOCALIZATION  
ACUITY  
ADAPTATION  
ARTIFICIAL INTELLIGENCE  
CHARACTER RECOGNITION  
COGNITION  
COLOR  
CONTRAST  
ELECTROCUANEUS COMMUNICATION  
% FREQUENCY RESPONSE  
IDENTIFYING  
ILLUSIONS  
IMAGES  
INFORMATION PROCESSING (BIOLOGY )  
% INTERPRETATION  
KNOWLEDGE  
LEGIBILITY  
MONOCULAR VISION  
PERCEPTUAL TIME CONSTANT

RT

READING  
RESOLUTION  
RETINAL ADAPTATION  
SENSITIVITY  
SENSORY DEPRIVATION  
SENSORY FEEDBACK  
SYMBOLS  
THRESHOLDS (PERCEPTION)  
VISIBILITY  
VISION

## PERCEPTONS

USE SELF ORGANIZING SYSTEMS

## PERCEPTUAL ERRORS

0408  
RT DISPLAY DEVICES  
VISUAL PERCEPTION  
VISUAL STIMULI

## PERCEPTUAL TIME CONSTANT

0405 0408  
GS CONSTANTS  
.TIME CONSTANT  
...#PERCEPTUAL TIME CONSTANT  
RT PERCEPTION  
REACTION TIME  
SENSE ORGANS  
SENSORMOTOR PERFORMANCE  
VELOCITY

## PERCHLORATES

0603 1704 1804 1805  
GS HALOGEN COMPOUNDS  
...CHLORINE COMPOUNDS  
...PERCHLORATES  
...ALUMINIUM PERCHLORATES  
...AMMONIUM PERCHLORATES  
...HYDRAZINE PERCHLORATES  
...HYDROGEN PERCHLORATE  
...HYDROXYLAMMONIUM PERCHLORATES  
...LITHIUM PERCHLORATES  
...MAGNESIUM PERCHLORATES  
...NITRONIUM PERCHLORATE  
...POTASSIUM PERCHLORATES  
RT CHLDRATES  
PERCHLORIC ACID

## PERCHLORIC ACID

0405 0408 0603 1804  
GS ACIDS  
#PERCHLORIC ACID  
RT PERCHLORATES

## PERCHLORYL FLUORIDES

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                                     |  |  |  |
|-------------------------------------|--|--|--|
| OPERATOR PERFORMANCE                |  |  |  |
| OPTICAL TRANSFER FUNCTION           |  |  |  |
| OUTPUT                              |  |  |  |
| PERFORMANCE TESTS                   |  |  |  |
| PILOT PERFORMANCE                   |  |  |  |
| POSTFLIGHT ANALYSIS                 |  |  |  |
| PROPULSION SYSTEM PERFORMANCE       |  |  |  |
| QUALITY                             |  |  |  |
| RATINGS                             |  |  |  |
| RELIABILITY                         |  |  |  |
| SPACECRAFT PERFORMANCE              |  |  |  |
| STANDARDS                           |  |  |  |
| TASK COMPLEXITY                     |  |  |  |
| TRAINING EVALUATION                 |  |  |  |
| PERFORMANCE PREDICTION              |  |  |  |
| 1505 1905 3406                      |  |  |  |
| GS                                  |  |  |  |
| FORECASTING                         |  |  |  |
| #PERFORMANCE PREDICTION             |  |  |  |
| PREDICTIONS                         |  |  |  |
| #PERFORMANCE PREDICTION             |  |  |  |
| EVALUATION                          |  |  |  |
| MANAGEMENT                          |  |  |  |
| PREDICTION ANALYSIS TECHNIQUES      |  |  |  |
| RELIABILITY                         |  |  |  |
| RELIABILITY ANALYSIS                |  |  |  |
| RELIABILITY ENGINEERING             |  |  |  |
| TREND ANALYSIS                      |  |  |  |
| PERFORMANCE TESTS                   |  |  |  |
| 3404                                |  |  |  |
| SN                                  |  |  |  |
| (APPLY ONLY TO OPERATING EQUIPMENT) |  |  |  |
| ACCELERATED LIFE TESTS              |  |  |  |
| ACCEPTABILITY                       |  |  |  |
| CERTIFICATION                       |  |  |  |
| CHECKOUT                            |  |  |  |
| COMPUTER SYSTEMS PERFORMANCE        |  |  |  |
| INSPECTION                          |  |  |  |
| % PERFORMANCE                       |  |  |  |
| SPACE VEHICLE CHECKOUT PROGRAM      |  |  |  |
| SPECIFICATIONS                      |  |  |  |
| STANDARDS                           |  |  |  |
| % TESTS                             |  |  |  |
| PERFUSION                           |  |  |  |
| USE DIFFUSION                       |  |  |  |
| PERICLASE                           |  |  |  |
| 1806 2601                           |  |  |  |
| GS                                  |  |  |  |
| CHALCOGENIDES                       |  |  |  |
| .OXIDES                             |  |  |  |
| ..METAL OXIDES                      |  |  |  |
| ....ALKALINE EARTH OXIDES           |  |  |  |
| ....MAGNESIUM OXIDES                |  |  |  |
| ....#PERICLASE                      |  |  |  |
| MAGNESIUM COMPOUNDS                 |  |  |  |
| .MAGNESIUM OXIDES                   |  |  |  |
| .#PERICLASE                         |  |  |  |
| PERIDOTITE                          |  |  |  |
| 1806 2601                           |  |  |  |
| UF                                  |  |  |  |
| GS                                  |  |  |  |
| KIMBERLITE                          |  |  |  |
| ROCKS                               |  |  |  |
| .IGNEOUS ROCKS                      |  |  |  |
| .#PERIDOTITE                        |  |  |  |
| CHROMITES                           |  |  |  |
| DUNITE                              |  |  |  |
| OLIVINE                             |  |  |  |
| REGOLITH                            |  |  |  |
| SOILS                               |  |  |  |
| PERIGEE-APOGEE SATELLITES           |  |  |  |
| USE PAS                             |  |  |  |
| PERIGEEES                           |  |  |  |
| 1901 1904 3006 3009                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIGEEES                          |  |  |  |
| RT                                  |  |  |  |
| APOGEEES                            |  |  |  |
| EARTH ORBITS                        |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITS                              |  |  |  |
| PERILUNES                           |  |  |  |
| PERIHELIONS                         |  |  |  |
| 1901 1904 3001 3002                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIHELIONS                        |  |  |  |
| RT                                  |  |  |  |
| APHELIONS                           |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITAL ELEMENTS                    |  |  |  |
| ORBITS                              |  |  |  |
| SOLAR ORBITS                        |  |  |  |
| PERILUNES                           |  |  |  |
| 1904 2102 3004 3006                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERILUNES                          |  |  |  |
| RT                                  |  |  |  |
| LUNAR ORBITS                        |  |  |  |
| LUNAR SATELLITES                    |  |  |  |
| PERIGEEES                           |  |  |  |
| PERIOD DOUBLING                     |  |  |  |
| 1902 2311 3408                      |  |  |  |
| GS                                  |  |  |  |
| BRANCHING (MATHEMATICS)             |  |  |  |
| #PERIOD DOUBLING                    |  |  |  |
| RT                                  |  |  |  |
| CHAOS                               |  |  |  |
| PERIODIC FUNCTIONS                  |  |  |  |
| TRANSITION FLOW                     |  |  |  |
| TURBULENCE                          |  |  |  |
| PERIODIC COMPOUNDS                  |  |  |  |
| .MAGNESIUM OXIDES                   |  |  |  |
| .#PERICLASE                         |  |  |  |
| PERIODOTITE                         |  |  |  |
| 1806 2601                           |  |  |  |
| UF                                  |  |  |  |
| GS                                  |  |  |  |
| KIMBERLITE                          |  |  |  |
| ROCKS                               |  |  |  |
| .IGNEOUS ROCKS                      |  |  |  |
| .#PERIDOTITE                        |  |  |  |
| CHROMITES                           |  |  |  |
| DUNITE                              |  |  |  |
| OLIVINE                             |  |  |  |
| REGOLITH                            |  |  |  |
| SOILS                               |  |  |  |
| PERIGEE-APOGEE SATELLITES           |  |  |  |
| USE PAS                             |  |  |  |
| PERIGEEES                           |  |  |  |
| 1901 1904 3006 3009                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIGEEES                          |  |  |  |
| RT                                  |  |  |  |
| APOGEEES                            |  |  |  |
| EARTH ORBITS                        |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITS                              |  |  |  |
| PERILUNES                           |  |  |  |
| PERIHELIONS                         |  |  |  |
| 1901 1904 3001 3002                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIHELIONS                        |  |  |  |
| RT                                  |  |  |  |
| APHELIONS                           |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITAL ELEMENTS                    |  |  |  |
| ORBITS                              |  |  |  |
| SOLAR ORBITS                        |  |  |  |
| PERILUNES                           |  |  |  |
| 1904 2102 3004 3006                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERILUNES                          |  |  |  |
| RT                                  |  |  |  |
| LUNAR ORBITS                        |  |  |  |
| LUNAR SATELLITES                    |  |  |  |
| PERIGEEES                           |  |  |  |
| PERIOD DOUBLING                     |  |  |  |
| 1902 2311 3408                      |  |  |  |
| GS                                  |  |  |  |
| BRANCHING (MATHEMATICS)             |  |  |  |
| #PERIOD DOUBLING                    |  |  |  |
| RT                                  |  |  |  |
| CHAOS                               |  |  |  |
| PERIODIC FUNCTIONS                  |  |  |  |
| TRANSITION FLOW                     |  |  |  |
| TURBULENCE                          |  |  |  |
| PERIODIC COMPOUNDS                  |  |  |  |
| .MAGNESIUM OXIDES                   |  |  |  |
| .#PERICLASE                         |  |  |  |
| PERIDOTITE                          |  |  |  |
| 1806 2601                           |  |  |  |
| UF                                  |  |  |  |
| GS                                  |  |  |  |
| KIMBERLITE                          |  |  |  |
| ROCKS                               |  |  |  |
| .IGNEOUS ROCKS                      |  |  |  |
| .#PERIDOTITE                        |  |  |  |
| CHROMITES                           |  |  |  |
| DUNITE                              |  |  |  |
| OLIVINE                             |  |  |  |
| REGOLITH                            |  |  |  |
| SOILS                               |  |  |  |
| PERIGEE-APOGEE SATELLITES           |  |  |  |
| USE PAS                             |  |  |  |
| PERIGEEES                           |  |  |  |
| 1901 1904 3006 3009                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIGEEES                          |  |  |  |
| RT                                  |  |  |  |
| APOGEEES                            |  |  |  |
| EARTH ORBITS                        |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITS                              |  |  |  |
| PERILUNES                           |  |  |  |
| PERIHELIONS                         |  |  |  |
| 1901 1904 3001 3002                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIHELIONS                        |  |  |  |
| RT                                  |  |  |  |
| APHELIONS                           |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITAL ELEMENTS                    |  |  |  |
| ORBITS                              |  |  |  |
| SOLAR ORBITS                        |  |  |  |
| PERILUNES                           |  |  |  |
| 1904 2102 3004 3006                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERILUNES                          |  |  |  |
| RT                                  |  |  |  |
| LUNAR ORBITS                        |  |  |  |
| LUNAR SATELLITES                    |  |  |  |
| PERIGEEES                           |  |  |  |
| PERIOD DOUBLING                     |  |  |  |
| 1902 2311 3408                      |  |  |  |
| GS                                  |  |  |  |
| BRANCHING (MATHEMATICS)             |  |  |  |
| #PERIOD DOUBLING                    |  |  |  |
| RT                                  |  |  |  |
| CHAOS                               |  |  |  |
| PERIODIC FUNCTIONS                  |  |  |  |
| TRANSITION FLOW                     |  |  |  |
| TURBULENCE                          |  |  |  |
| PERIODIC COMPOUNDS                  |  |  |  |
| .MAGNESIUM OXIDES                   |  |  |  |
| .#PERICLASE                         |  |  |  |
| PERIDOTITE                          |  |  |  |
| 1806 2601                           |  |  |  |
| UF                                  |  |  |  |
| GS                                  |  |  |  |
| KIMBERLITE                          |  |  |  |
| ROCKS                               |  |  |  |
| .IGNEOUS ROCKS                      |  |  |  |
| .#PERIDOTITE                        |  |  |  |
| CHROMITES                           |  |  |  |
| DUNITE                              |  |  |  |
| OLIVINE                             |  |  |  |
| REGOLITH                            |  |  |  |
| SOILS                               |  |  |  |
| PERIGEE-APOGEE SATELLITES           |  |  |  |
| USE PAS                             |  |  |  |
| PERIGEEES                           |  |  |  |
| 1901 1904 3006 3009                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIGEEES                          |  |  |  |
| RT                                  |  |  |  |
| APOGEEES                            |  |  |  |
| EARTH ORBITS                        |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITS                              |  |  |  |
| PERILUNES                           |  |  |  |
| PERIHELIONS                         |  |  |  |
| 1901 1904 3001 3002                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIHELIONS                        |  |  |  |
| RT                                  |  |  |  |
| APHELIONS                           |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITAL ELEMENTS                    |  |  |  |
| ORBITS                              |  |  |  |
| SOLAR ORBITS                        |  |  |  |
| PERILUNES                           |  |  |  |
| 1904 2102 3004 3006                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERILUNES                          |  |  |  |
| RT                                  |  |  |  |
| LUNAR ORBITS                        |  |  |  |
| LUNAR SATELLITES                    |  |  |  |
| PERIGEEES                           |  |  |  |
| PERIOD DOUBLING                     |  |  |  |
| 1902 2311 3408                      |  |  |  |
| GS                                  |  |  |  |
| BRANCHING (MATHEMATICS)             |  |  |  |
| #PERIOD DOUBLING                    |  |  |  |
| RT                                  |  |  |  |
| CHAOS                               |  |  |  |
| PERIODIC FUNCTIONS                  |  |  |  |
| TRANSITION FLOW                     |  |  |  |
| TURBULENCE                          |  |  |  |
| PERIODIC COMPOUNDS                  |  |  |  |
| .MAGNESIUM OXIDES                   |  |  |  |
| .#PERICLASE                         |  |  |  |
| PERIDOTITE                          |  |  |  |
| 1806 2601                           |  |  |  |
| UF                                  |  |  |  |
| GS                                  |  |  |  |
| KIMBERLITE                          |  |  |  |
| ROCKS                               |  |  |  |
| .IGNEOUS ROCKS                      |  |  |  |
| .#PERIDOTITE                        |  |  |  |
| CHROMITES                           |  |  |  |
| DUNITE                              |  |  |  |
| OLIVINE                             |  |  |  |
| REGOLITH                            |  |  |  |
| SOILS                               |  |  |  |
| PERIGEE-APOGEE SATELLITES           |  |  |  |
| USE PAS                             |  |  |  |
| PERIGEEES                           |  |  |  |
| 1901 1904 3006 3009                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIGEEES                          |  |  |  |
| RT                                  |  |  |  |
| APOGEEES                            |  |  |  |
| EARTH ORBITS                        |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITS                              |  |  |  |
| PERILUNES                           |  |  |  |
| PERIHELIONS                         |  |  |  |
| 1901 1904 3001 3002                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIHELIONS                        |  |  |  |
| RT                                  |  |  |  |
| APHELIONS                           |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITAL ELEMENTS                    |  |  |  |
| ORBITS                              |  |  |  |
| SOLAR ORBITS                        |  |  |  |
| PERILUNES                           |  |  |  |
| 1904 2102 3004 3006                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERILUNES                          |  |  |  |
| RT                                  |  |  |  |
| LUNAR ORBITS                        |  |  |  |
| LUNAR SATELLITES                    |  |  |  |
| PERIGEEES                           |  |  |  |
| PERIOD DOUBLING                     |  |  |  |
| 1902 2311 3408                      |  |  |  |
| GS                                  |  |  |  |
| BRANCHING (MATHEMATICS)             |  |  |  |
| #PERIOD DOUBLING                    |  |  |  |
| RT                                  |  |  |  |
| CHAOS                               |  |  |  |
| PERIODIC FUNCTIONS                  |  |  |  |
| TRANSITION FLOW                     |  |  |  |
| TURBULENCE                          |  |  |  |
| PERIODIC COMPOUNDS                  |  |  |  |
| .MAGNESIUM OXIDES                   |  |  |  |
| .#PERICLASE                         |  |  |  |
| PERIDOTITE                          |  |  |  |
| 1806 2601                           |  |  |  |
| UF                                  |  |  |  |
| GS                                  |  |  |  |
| KIMBERLITE                          |  |  |  |
| ROCKS                               |  |  |  |
| .IGNEOUS ROCKS                      |  |  |  |
| .#PERIDOTITE                        |  |  |  |
| CHROMITES                           |  |  |  |
| DUNITE                              |  |  |  |
| OLIVINE                             |  |  |  |
| REGOLITH                            |  |  |  |
| SOILS                               |  |  |  |
| PERIGEE-APOGEE SATELLITES           |  |  |  |
| USE PAS                             |  |  |  |
| PERIGEEES                           |  |  |  |
| 1901 1904 3006 3009                 |  |  |  |
| GS                                  |  |  |  |
| APSIDES                             |  |  |  |
| #PERIGEEES                          |  |  |  |
| RT                                  |  |  |  |
| APOGEEES                            |  |  |  |
| EARTH ORBITS                        |  |  |  |
| ELLIPTICAL ORBITS                   |  |  |  |
| ORBITS                              |  |  |  |
| PERILUNES                           |  |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>% RHYTHM</p> <p>SEMIREGULAR VARIABLE STARS</p> <p>SOUTHERN OSCILLATION</p> <p>TRENDS</p> <p>VARIABLE STARS</p> <p>VARIABLE STARS</p> <p>PERIODICALS</p> <p>3405</p> <p>UF JOURNALS (DOCUMENTS)</p> <p>GS DOCUMENTS</p> <p>#PERIODICALS</p> <p>RT % JOURNALS</p> <p>RECORDS</p> <p>PERIODICITY</p> <p>USE PERIODIC VARIATIONS</p> <p>PERIODICITY (BIOLOGY)</p> <p>USE RHYTHM (BIOLOGY)</p> <p>PERIPHERAL CIRCULATION</p> <p>O402 O404 O405</p> <p>GS CIRCULATION</p> <p>.BLOOD CIRCULATION</p> <p>.#PERIPHERAL CIRCULATION</p> <p>PERIPHERAL EQUIPMENT (COMPUTERS)</p> <p>O801</p> <p>SN (EXCLUDES COMPUTER-CONTROLLED EQUIPMENT)</p> <p>UF AUXILIARY EQUIPMENT (COMPUTERS)</p> <p>GS DATA PROCESSING EQUIPMENT</p> <p>#PERIPHERAL EQUIPMENT (COMPUTERS)</p> <p>.PRINTERS (DATA PROCESSING)</p> <p>--REMOTE CONSOLES</p> <p>ANALOG TO DIGITAL CONVERTERS</p> <p>COMPUTER STORAGE DEVICES</p> <p>COMPUTER SYSTEMS DESIGN</p> <p>DATA PROCESSING</p> <p>DIGITAL TO ANALOG CONVERTERS</p> <p>% EQUIPMENT</p> <p>MAGNETIC DISKS</p> <p>MAGNETIC TAPES</p> <p>MODEMS</p> <p>PLOTTERS</p> <p>PERIPHERAL JET FLOW</p> <p>O101 1202 2806</p> <p>GS FLUID FLOW</p> <p>.JET FLOW</p> <p>.#PERIPHERAL JET FLOW</p> <p>DOWNWASH</p> <p>GROUND EFFECT (AERODYNAMICS)</p> <p>GROUND EFFECT MACHINES</p> | <p>LIFT AUGMENTATION</p> <p>PERIPHERAL NERVOUS SYSTEM</p> <p>O404 O408</p> <p>GS ANATOMY</p> <p>.NERVOUS SYSTEM</p> <p>.#PERIPHERAL NERVOUS SYSTEM</p> <p>RT NEUROMUSCULAR TRANSMISSION</p> <p>% SYSTEMS</p> <p>PERIPHERAL VISION</p> <p>O404 O408</p> <p>GS VISION</p> <p>#PERIPHERAL VISION</p> <p>RT SPACE PERCEPTION</p> <p>VISUAL ACUITY</p> <p>VISUAL FIELDS</p> <p>PERIPHERIES</p> <p>USE BOUNDARIES</p> <p>PERISCOPES</p> <p>2310</p> <p>GS OPTICAL EQUIPMENT</p> <p>#PERISCOPES</p> <p>RT BINOCULARS</p> <p>EYEPIECES</p> <p>OPTICAL MEASURING INSTRUMENTS</p> <p>TELESCOPES</p> <p>VIEWING</p> <p>PERITONEUM</p> <p>O404 O405</p> <p>GS ANATOMY</p> <p>#PERITONEUM</p> <p>MEMBRANES</p> <p>#PERITONEUM</p> <p>RT ABDOMEN</p> <p>EPITHELIUM</p> <p>TISSUES (BIOLOGY)</p> <p>VISCERA</p> <p>PERMAFROST</p> <p>1305 1306 3009</p> <p>UF FROZEN SOILS</p> <p>GS SOILS</p> <p>#PERMAFROST</p> <p>RT AUFEIS (ICE)</p> <p>POLAR REGIONS</p> <p>PERMALLOYS (TRADEMARK)</p> <p>1701 1704 2307</p> <p>GS ALLOYS</p> <p>#PERMALLOYS (TRADEMARK)</p> <p>MAGNETIC MATERIALS</p> | <p>.FERROMAGNETIC MATERIALS</p> <p>.#PERMALLOYS (TRADEMARK)</p> <p>RT IRON ALLOYS</p> <p>MAGNETS</p> <p>MOLYBDENUM ALLOYS</p> <p>NICKEL ALLOYS</p> <p>PERMANENT MAGNETS</p> <p>PERMANENT MAGNETS</p> <p>O801 O904 1504 1701 2307</p> <p>GS MAGNETS</p> <p>#PERMANENT MAGNETS</p> <p>RT FERRIMAGNETS</p> <p>FERROMAGNETIC MATERIALS</p> <p>MAGNETIC MATERIALS</p> <p>PERMALLOYS (TRADEMARK)</p> <p>PERMANGANATES</p> <p>O603 1804</p> <p>GS MANGANESE COMPOUNDS</p> <p>#PERMANGANATES</p> <p>RT MANGANESE IONS</p> <p>PERMEABILITY</p> <p>O406 O603 1203 1802 3408</p> <p>SN (EXCLUDES MAGNETIC PERMEABILITY)</p> <p>GS #PERMEABILITY</p> <p>.DIELECTRIC PERMEABILITY</p> <p>RT AQUIFERS</p> <p>DENSITY (MASS/VOLUME)</p> <p>DIFFUSION</p> <p>DIFFUSIVITY</p> <p>DRAINAGE</p> <p>FORMATIONS</p> <p>INFILTRATION</p> <p>INTERSTICES</p> <p>LEACHING</p> <p>LEAKAGE</p> <p>MECHANICAL PROPERTIES</p> <p>PENETRATION</p> <p>PERCOLATION</p> <p>PERMEATING</p> <p>% PHYSICAL PROPERTIES</p> <p>POROSITY</p> <p>% RESISTANCE</p> <p>SEEPAGE</p> <p>SURFACE PROPERTIES</p> <p>VOID RATIO</p> <p>VOIDS</p> <p>WETTABILITY</p> <p>PERMEATING</p> <p>O406 O602 1203 2306</p> <p>RT % ABSORPTION</p> <p>DESORPTION</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## NASA THESAURUS HIERARCHICAL UPDATE

|                            |  |                                  |    |                           |
|----------------------------|--|----------------------------------|----|---------------------------|
| DIALYSIS                   |  | ....ORGANIC PEROXIDES            | GS | #PERSONNEL                |
| DIFFUSION                  |  | ....SODIUM PEROXIDES             |    | .AIR TRAFFIC CONTROLLERS  |
| DISPENSING                 |  | RT DIOXIDES                      |    | (PERSONNEL)               |
| IMPREGNATING               |  |                                  |    | .CREWS                    |
| OSMOSIS                    |  | PERSEID METEORIDS                |    | ..FLIGHT CREWS            |
| PENETRATION                |  | 3003 3005                        |    | ...SPACECREWS             |
| PERCOLATION                |  | GS CELESTIAL BODIES              |    | .ENEMY PERSONNEL          |
| PERMEABILITY               |  | .METEOROID SHOWERS               |    | .ENGINEERS                |
| POROSITY                   |  | .#PERSEID METEORIDS              |    | .FLYING PERSONNEL         |
| REVERSE OSMOSIS            |  | .METEORIDS                       |    | ..ASTRONAUTS              |
| % SATURATION               |  | .#PERSEID METEORIDS              |    | ...ORBITAL WORKERS        |
| SORPTION                   |  |                                  |    | ..COSMONAUTS              |
| TRANSPIRATION              |  | PERTHING MISSILE                 |    | ..FLIGHT CREWS            |
|                            |  | 3101 3404                        |    | ...SPACECREWS             |
| PERMISSIVITY               |  | GS MISSILES                      |    | ...PILOTS (PERSONNEL)     |
| 3408                       |  | .BALLISTIC MISSILES              |    | ...AIRCRAFT PILOTS        |
| RT COMPATIBILITY           |  | .#PERTHING MISSILE               |    | ....TEST PILOTS           |
| PSYCHOLOGICAL FACTORS      |  | .SURFACE TO SURFACE MISSILES     |    | .GROUND CREWS             |
|                            |  | .#PERTHING MISSILE               |    | .INSTRUCTORS              |
| PERMITTIVITY               |  | RT MULTISTAGE ROCKET VEHICLES    |    | .MEDICAL PERSONNEL        |
| O904 1801 1805 2304        |  | SOLID PROPELLANT ROCKET ENGINES  |    | ..FLIGHT NURSES           |
| UF DIELECTRIC CONSTANT     |  |                                  |    | ..PHYSICIANS              |
| GS ELECTRICAL PROPERTIES   |  | PERSIAN GULF                     |    | ..SURGEONS                |
| .DIELECTRIC PROPERTIES     |  | 1305                             |    | ...FLIGHT SURGEONS        |
| .#PERMITTIVITY             |  | GS GULFS                         |    | .NAVIGATORS               |
| RT ELECTRIC FIELDS         |  | #PERSIAN GULF                    |    | .OPERATORS (PERSONNEL)    |
| FIELD STRENGTH             |  | RT INLETS (TOPOGRAPHY)           |    | ..PILOTS (PERSONNEL)      |
|                            |  |                                  |    | ...AIRCRAFT PILOTS        |
| PERMUTATIONS               |  | PERSONAL COMPUTERS               |    | ....TEST PILOTS           |
| 1902 1905                  |  | O801                             |    | ..POLICE                  |
| GS ANALYSIS (MATHEMATICS)  |  | GS DATA PROCESSING EQUIPMENT     |    | .PROGRAMMERS              |
| .COMBINATORIAL ANALYSIS    |  | .COMPUTERS                       |    | .SCIENTISTS               |
| .#PERMUTATIONS             |  | ..DIGITAL COMPUTERS              |    | RT % COMPLEMENT           |
| RT % COMBINATION           |  | ...MICROCOMPUTERS                |    | CONSULTING                |
| COMBINATIONS (MATHEMATICS) |  | ...#PERSONAL COMPUTERS           |    | CREW EXPERIMENT STATIONS  |
| PARTITIONS (MATHEMATICS)   |  | .....IBM PERSONAL COMPUTERS      |    | CREW OBSERVATION STATIONS |
| SET THEORY                 |  | ....MACINTOSH PERSONAL COMPUTERS |    | CREW WORKSTATIONS         |
|                            |  | RT COMPUTER TECHNIQUES           |    | DEPERSONALIZATION         |
| PEROVSKITES                |  | VSAT (NETWORK)                   |    | DEPLOYMENT                |
| 1806                       |  |                                  |    | EMPLOYEE RELATIONS        |
| GS CALCIUM COMPOUNDS       |  | PERSONALITY TESTS                |    | % ESTIMATORS              |
| #PEROVSKITES               |  | O408 0410                        |    | HELMET MOUNTED DISPLAYS   |
| MINERALS                   |  | RT DEPERSONALIZATION             |    | HUMAN RESOURCES           |
| #PEROVSKITES               |  | PERSONNEL SELECTION              |    | INCENTIVES                |
| TITANIUM COMPOUNDS         |  |                                  |    | INHABITANTS               |
| .TITANATES                 |  | PERSONALITY TESTS                |    | MANPOWER                  |
| .#PEROVSKITES              |  | O408 0410 0502                   |    | OCCUPATION                |
|                            |  | RT INTELLIGENCE TESTS            |    | ORGANIZING                |
| PEROXIDES                  |  | PSYCHOLOGICAL TESTS              |    | POSITION (TITLE)          |
| O603 1804                  |  | PSYCHOMETRICS                    |    | QUALIFICATIONS            |
| GS CHALCOGENIDES           |  | QUALIFICATIONS                   |    | RESEARCH MANAGEMENT       |
| .OXIDES                    |  | % TESTS                          |    | RESOURCES                 |
| ..ANHYDRIDES               |  |                                  |    | RETIREMENT                |
| ..#PEROXIDES               |  | PERSONNEL                        |    | RETRAINING                |
| ....INORGANIC PEROXIDES    |  | 3406 0502                        |    | SERVICES                  |

UNIONIZATION  
 WAGE SURVEYS  
 PERSONNEL DEVELOPMENT  
 3406  
 RT % DEVELOPMENT  
 EMPLOYEE RELATIONS  
 HUMAN RESOURCES  
 MANAGEMENT  
 RESOURCES  
 TRAINING ANALYSIS  
 PERSONNEL MANAGEMENT  
 0410 0502 3406 4001  
 GS MANAGEMENT  
 . INDUSTRIAL MANAGEMENT  
 .#PERSONNEL MANAGEMENT  
 RT EMPLOYEE RELATIONS  
 HUMAN RELATIONS  
 HUMAN RESOURCES  
 LEADERSHIP  
 MANAGEMENT PLANNING  
 PERSONNEL PROPULSION SYSTEMS  
 USE SELF MANEUVERING UNITS  
 PERSONNEL SELECTION  
 0410 0502 3406  
 GS SELECTION  
 #PERSONNEL SELECTION  
 ..PILOT SELECTION  
 RT APTITUDE  
 EMPLOYMENT  
 INTELLIGENCE TESTS  
 LABOR  
 PERSONALITY  
 PHYSICAL EXAMINATIONS  
 PHYSIOLOGICAL TESTS  
 PERSONNEL SUBSYSTEMS  
 0410 3406  
 RT INDUSTRIES  
 PERSPEX (TRADEMARK)  
 1808 1809 1810  
 GS PLASTICS  
 #PERSPEX (TRADEMARK)  
 PERSPIRATION  
 0404 0405 0505  
 UF SWEATING  
 RT BODY FLUIDS  
 BODY TEMPERATURE  
 EVAPORATION  
 EXCRETION  
 FECS  
 HEAT ACCLIMATIZATION  
 HUMIDITY  
 PALMAR SWEAT INDEX  
 SKIN (ANATOMY)  
 SWEAT  
 TRANSPIRATION  
 PERT  
 0802 3405 3406 4001  
 UF PROGRAM EVALUATION REVIEW TECHNIQUE  
 RT COMMERCE  
 CONTRACT MANAGEMENT  
 CRITICAL PATH METHOD  
 GERT  
 MANAGEMENT ANALYSIS  
 MANAGEMENT METHODS  
 MANAGEMENT PLANNING  
 % PATHS  
 PROGRAM TREND LINE ANALYSIS  
 PROJECT MANAGEMENT  
 PERTURBATION  
 1902 2311 2602 3001 3407 3009  
 GS #PERTURBATION  
 . ORBIT PERTURBATION  
 ..SATELLITE PERTURBATION  
 RT % DISTURBANCES  
 FOUR BODY PROBLEM  
 GEODESY  
 LONG TERM EFFECTS  
 MANY BODY PROBLEM  
 NUTATION  
 ORBITAL MECHANICS  
 OSCILLATIONS  
 OSCILLATORS  
 RADIATION PRESSURE  
 SCHACH EFFECT  
 THREE BODY PROBLEM  
 TWO BODY PROBLEM  
 VARIATIONS  
 PERTURBATION THEORY  
 0802 1901 1902 2402 2602  
 UF DISTURBANCE THEORY  
 GS #PERTURBATION THEORY  
 .VINTI THEORY  
 RT BOUSSINESQ APPROXIMATION  
 CELESTIAL MECHANICS  
 DISTURBING FUNCTIONS  
 HANSEN LUNAR THEORY  
 HARTREE APPROXIMATION  
 HILL LUNAR THEORY  
 HILL METHOD  
 MANY BODY PROBLEM  
 OPERATORS (MATHEMATICS)  
 ORBIT PERTURBATION  
 ORBITAL ELEMENTS  
 QUANTUM THEORY  
 STRANGE ATTRACTORS  
 TAYLOR INSTABILITY  
 % THEORIES  
 VON ZEIPPEL METHOD  
 WAVE FUNCTIONS  
 WENTZEL-KRAMER-BRILLOUIN METHOD  
 YANG-MILLS FIELDS  
 YANG-MILLS THEORY  
 PERU  
 1305  
 GS NATIONS  
 #PERU  
 RT SOUTH AMERICA  
 PERVEANCE  
 1001 1002 2304  
 GS RATIOS  
 #PERVEANCE  
 RT CHILD-LANGMUIR LAW  
 SPACE CHARGE  
 THERMIONIC DIODES  
 VACUUM TUBES  
 WORK FUNCTIONS  
 PESTICIDES  
 0412 3108  
 GS POISONS  
 #PESTICIDES  
 ..INSECTICIDES  
 ...DIELDRIN  
 CROP DUSTING  
 RT ENVIRONMENTAL CHEMISTRY  
 TOXICOLOGY  
 PETALS  
 0404 0409  
 RT PLANTS (BOTANY)  
 PETECHIA  
 0404 0405  
 GS HEMORRHAGES  
 #PETECHIA  
 RT SKIN (ANATOMY)  
 PETN  
 1808 3302  
 UF PENTAERYTHRITOL TETRANITRATE  
 GS ESTERS  
 .ORGANIC NITRATES  
 .#PETN



# NASA THESAURUS HIERARCHICAL UPDATE

|                                |  |  |  |
|--------------------------------|--|--|--|
| NITROGEN COMPOUNDS             |  |  |  |
| .NITRATES                      |  |  |  |
| ..ORGANIC NITRATES             |  |  |  |
| ..#PETN                        |  |  |  |
| RT EXPLOSIVES                  |  |  |  |
| PETREL SOUNDING ROCKET         |  |  |  |
| 3106 3108 3409                 |  |  |  |
| GS ROCKET VEHICLES             |  |  |  |
| .SOUNDING ROCKETS              |  |  |  |
| .#PETREL SOUNDING ROCKET       |  |  |  |
| RT % ROCKETS                   |  |  |  |
| PETRI NETS                     |  |  |  |
| 1902                           |  |  |  |
| GS MODELS                      |  |  |  |
| .MATHEMATICAL MODELS           |  |  |  |
| .#PETRI NETS                   |  |  |  |
| NETS                           |  |  |  |
| #PETRI NETS                    |  |  |  |
| CONSECUTIVE EVENTS             |  |  |  |
| DYNAMIC MODELS                 |  |  |  |
| GRAPHS (CHARTS)                |  |  |  |
| INFORMATION THEORY             |  |  |  |
| SEQUENCING                     |  |  |  |
| TREES (MATHEMATICS)            |  |  |  |
| PETROGRAPHY                    |  |  |  |
| 1306 1806 3009                 |  |  |  |
| GS GEOLOGY                     |  |  |  |
| .PETROLOGY                     |  |  |  |
| .#PETROGRAPHY                  |  |  |  |
| RT INLIERS (LANDFORMS)         |  |  |  |
| ROCKS                          |  |  |  |
| SEDIMENTARY ROCKS              |  |  |  |
| PETROLEUM                      |  |  |  |
| USE CRUDE OIL                  |  |  |  |
| PETROLEUM PRODUCTS             |  |  |  |
| 2701                           |  |  |  |
| GS PRODUCTS                    |  |  |  |
| #PETROLEUM PRODUCTS            |  |  |  |
| ...ASPHALT                     |  |  |  |
| ..DIESEL FUELS                 |  |  |  |
| ..GASOLINE                     |  |  |  |
| ..TARS                         |  |  |  |
| RT BUTANES                     |  |  |  |
| CRUDE OIL                      |  |  |  |
| GREASES                        |  |  |  |
| KEROGEN                        |  |  |  |
| LUBRICANTS                     |  |  |  |
| LUBRICATING OILS               |  |  |  |
| METHANE                        |  |  |  |
| NATURAL GAS                    |  |  |  |
| OILS                           |  |  |  |
| PLASTICS                       |  |  |  |
| POLYNUCLEAR ORGANIC COMPOUNDS  |  |  |  |
| PETROLOGY                      |  |  |  |
| 1306 1308 3009                 |  |  |  |
| GS GEOLOGY                     |  |  |  |
| #PETROLOGY                     |  |  |  |
| ..PETROGRAPHY                  |  |  |  |
| RT CONES (VOLCANOES)           |  |  |  |
| FORMATIONS                     |  |  |  |
| GEOCHEMISTRY                   |  |  |  |
| GEOLOGICAL SURVEYS             |  |  |  |
| GEOPHYSICS                     |  |  |  |
| IMPACT MELTS                   |  |  |  |
| INLIERS (LANDFORMS)            |  |  |  |
| MARS VOLCANOES                 |  |  |  |
| MINERALOGY                     |  |  |  |
| ROCKS                          |  |  |  |
| STRATIGRAPHY                   |  |  |  |
| VOLCANOES                      |  |  |  |
| VOLCANOLOGY                    |  |  |  |
| PFAFF EQUATION                 |  |  |  |
| 1902                           |  |  |  |
| GS ANALYSIS (MATHEMATICS)      |  |  |  |
| #PFAFF EQUATION                |  |  |  |
| RT DIFFERENTIAL EQUATIONS      |  |  |  |
| % EQUATIONS                    |  |  |  |
| THERMODYNAMICS                 |  |  |  |
| PFM (MODULATION)               |  |  |  |
| USE PULSE FREQUENCY MODULATION |  |  |  |
| PH                             |  |  |  |
| 0602 0603 1804                 |  |  |  |
| RT ACID BASE EQUILIBRIUM       |  |  |  |
| ACID RAIN                      |  |  |  |
| ACIDITY                        |  |  |  |
| ACIDOSIS                       |  |  |  |
| ALKALINITY                     |  |  |  |
| ALKALOSIS                      |  |  |  |
| BASES (CHEMICAL)               |  |  |  |
| BUFFERS (CHEMISTRY)            |  |  |  |
| HYDROGEN IONS                  |  |  |  |
| PH FACTOR                      |  |  |  |
| 0601 0603 1804                 |  |  |  |
| RT ACID BASE EQUILIBRIUM       |  |  |  |
| ACIDOSIS                       |  |  |  |
| ALKALOSIS                      |  |  |  |
| HYDROGEN IONS                  |  |  |  |
| ION CONCENTRATION              |  |  |  |
| PHANTASTRONS                   |  |  |  |
| O701 0905 1003 2402            |  |  |  |
| GS CIRCUITS                    |  |  |  |
| .DELAY CIRCUITS                |  |  |  |
| .#PHANTASTRONS                 |  |  |  |
| OSCILLATORS                    |  |  |  |
| .RELAXATION OSCILLATORS        |  |  |  |
| .#PHANTASTRONS                 |  |  |  |
| RT FEEDBACK AMPLIFIERS         |  |  |  |
| PHANTOM AIRCRAFT               |  |  |  |
| 0207                           |  |  |  |
| GS JET AIRCRAFT                |  |  |  |
| #PHANTOM AIRCRAFT              |  |  |  |
| ..F-4 AIRCRAFT                 |  |  |  |
| MCDONNELL DOUGLAS AIRCRAFT     |  |  |  |
| .MCDONNELL AIRCRAFT            |  |  |  |
| .#PHANTOM AIRCRAFT             |  |  |  |
| ...F-4 AIRCRAFT                |  |  |  |
| MONOPLANES                     |  |  |  |
| #PHANTOM AIRCRAFT              |  |  |  |
| ..F-4 AIRCRAFT                 |  |  |  |
| SUPERSONIC AIRCRAFT            |  |  |  |
| #PHANTOM AIRCRAFT              |  |  |  |
| ..F-4 AIRCRAFT                 |  |  |  |
| RT % AIRCRAFT                  |  |  |  |
| PHARMACOLOGY                   |  |  |  |
| 0404 0405 0603                 |  |  |  |
| GS #PHARMACOLOGY               |  |  |  |
| .PSYCHOPHARMACOLOGY            |  |  |  |
| RT ANESTHESIOLOGY              |  |  |  |
| ANTIRADIATION DRUGS            |  |  |  |
| BIOPROCESSING                  |  |  |  |
| CYCLIC AMP                     |  |  |  |
| DRUGS                          |  |  |  |
| MEDICAL SCIENCE                |  |  |  |
| % MEDICINE                     |  |  |  |
| MOTION SICKNESS DRUGS          |  |  |  |
| VASOCONSTRICTOR DRUGS          |  |  |  |
| VETERINARY MEDICINE            |  |  |  |
| PHARYNX                        |  |  |  |
| 0404 0405                      |  |  |  |
| GS ANATOMY                     |  |  |  |
| .RESPIRATORY SYSTEM            |  |  |  |
| .#PHARYNX                      |  |  |  |
| PHASE ANGLE                    |  |  |  |
| USE PHASE SHIFT                |  |  |  |
| PHASE CHANGE MATERIALS         |  |  |  |
| 1805                           |  |  |  |
| UF PCM (MATERIALS)             |  |  |  |
| RT CERESIN                     |  |  |  |
| CONDENSING                     |  |  |  |

FUSION (MELTING)  
 HEAT OF FUSION  
 HEAT STORAGE  
 HEAT TRANSFER  
 LIQUID-SOLID INTERFACES  
 % MATERIALS  
 MELTING  
 ORGANIC MATERIALS  
 PHASE TRANSFORMATIONS  
 SOLAR ENERGY  
 SOLAR ENERGY CONVERSION  
 SOLAR HEATING  
 SUBLIMATION  
 TROMBE WALLS  
 WAXES  
 WORKING FLUIDS

MODEMS

PHASE DETECTORS  
 0902 0905 1002  
 GS  
 #PHASE DETECTORS  
 ..SYNCHROSCOPES  
 RT % DETECTORS  
 PHASE LOCKED SYSTEMS  
 SIGNAL DETECTION  
 SYNCHRONISM

PHASE DEVIATION  
 1002 2304 2402  
 RT  
 AMPLITUDES  
 MODULATED CONTINUOUS RADIATION  
 SIGNAL ANALYSIS

PHASE COHERENCE  
 1002 2304 2402  
 RT % COHERENCE  
 COHERENCE COEFFICIENT  
 COHERENT LIGHT  
 FOUR-WAVE MIXING  
 WAVE FRONTS

PHASE CONJUGATION  
 1102  
 GS  
 CONJUGATION  
 #PHASE CONJUGATION  
 ..FOUR-WAVE MIXING

PHASE CONTRAST  
 1002 2304 2402  
 GS  
 CONTRAST  
 #PHASE CONTRAST  
 DIFFRACTION PATTERNS  
 ELECTRON MICROSCOPY  
 MICROSCOPY  
 OPTICAL MEASUREMENT  
 OPTICAL PATHS  
 SCANNING ELECTRON MICROSCOPY  
 TRANSMISSION ELECTRON MICROSCOPY

PHASE CONTROL  
 1001 1002 2304 2402  
 RT  
 CIRCUIT PROTECTION  
 % CONTROL  
 PHASE LOCKED SYSTEMS  
 TRANSFORMERS

PHASE DEMODULATORS  
 0902 0905 1001  
 GS  
 DEMODULATORS  
 #PHASE DEMODULATORS  
 RT BRAGG CELLS

0702 0905 1001  
 GS  
 DEMODULATORS  
 #PHASE LOCK DEMODULATORS  
 RT  
 CORRELATION DETECTION  
 PARAMETRONS

PHASE LOCKED SYSTEMS  
 0902 1003 2402  
 RT  
 FEEDBACK FREQUENCY MODULATION  
 OPTICAL COUPLING  
 PHASE CONTROL  
 PHASE DETECTORS  
 SYNCHRONIZED OSCILLATORS  
 % SYSTEMS  
 TRACKING FILTERS

PHASE MATCHING  
 0602  
 RT  
 CRYSTAL OPTICS  
 CRYSTALS

FREQUENCY MULTIPLIERS  
 HARMONIC GENERATIONS  
 LASER OUTPUTS  
 LASERS

PHASE MODULATION  
 0702 2304 2402  
 GS  
 CODING  
 .SIGNAL ENCODING  
 .#PHASE MODULATION  
 ...FM/PM (MODULATION)  
 ...PHASE SHIFT KEYING  
 ...BINARY PHASE SHIFT KEYING  
 ....QUADRATURE PHASE SHIFT KEYING  
 MODULATION

#PHASE MODULATION  
 ..FM/PM (MODULATION)  
 ..PHASE SHIFT KEYING  
 ...BINARY PHASE SHIFT KEYING  
 ...QUADRATURE PHASE SHIFT KEYING  
 RT  
 AMPLITUDE MODULATION  
 BRAGG CELLS  
 DEMODULATION  
 DEMODULATORS  
 FREQUENCY MODULATION  
 MODEMS

MODULATORS  
 PARAMETRIC FREQUENCY CONVERTERS  
 PULSE MODULATION  
 PUSH-PULL AMPLIFIERS  
 TRELLIS CODING

PHASE RESPONSE  
 USE  
 FREQUENCY RESPONSE  
 PHASE SHIFT

# NASA THESAURUS HIERARCHICAL UPDATE

|                              |                |                                       |                                |
|------------------------------|----------------|---------------------------------------|--------------------------------|
| PHASE RULE                   | 1902           | MODULATION                            | CONDENSING                     |
| GS                           | GS             | .PHASE MODULATION                     | CRITICAL TEMPERATURE           |
|                              |                | .#PHASE SHIFT KEYING                  | CRYSTALLIZATION                |
| RT                           | RT             | ...BINARY PHASE SHIFT KEYING          | DIRECTIONAL SOLIDIFICATION     |
|                              |                | ...QUADRATURE PHASE SHIFT KEYING      | (CRYSTALS)                     |
|                              |                | INFORMATION THEORY                    | ELECTRON-HOLE DROPS            |
|                              |                | QUADRATURE AMPLITUDE MODULATION       | HEAT OF FUSION                 |
|                              |                | TRELLIS CODING                        | ISING MODEL                    |
|                              |                |                                       | MARTENSITE                     |
| PHASE SEPARATION (MATERIALS) | 1701           | PHASE STABILITY (MATERIALS)           | MELT SPINNING                  |
| RT                           | RT             | 2603 3408                             | METAMORPHISM (GEOLOGY)         |
|                              |                | GS                                    | MUSHY ZONES                    |
|                              |                | STABILITY                             | NEEL TEMPERATURE               |
|                              |                | .#PHASE STABILITY (MATERIALS)         | ORDER-DISORDER TRANSFORMATIONS |
|                              |                | CRYSTALLIZATION                       | PHASE CHANGE MATERIALS         |
|                              |                | RT                                    | PHASE SEPARATION (MATERIALS)   |
|                              |                | PHASE DIAGRAMS                        | PHASE STABILITY (MATERIALS)    |
|                              |                | PHASE SEPARATION (MATERIALS)          | % PHASES                       |
|                              |                | PHASE TRANSFORMATIONS                 | SHAPE MEMORY ALLOYS            |
|                              |                | % PHASES                              | SOLIDIFICATION                 |
|                              |                | STABILIZATION                         | SOLIDS                         |
|                              |                |                                       | SYNTHETIC ALLOYS               |
| PHASE SHIFT                  | 1001 2304 2402 | PHASE SWITCHING INTERFEROMETERS       | % TRANSFORMATIONS              |
| UF                           | UF             | 1001 1405 2402 3009                   | % TRANSITION                   |
|                              |                | GS                                    | TRANSITION PRESSURE            |
|                              |                | MEASURING INSTRUMENTS                 | TRANSITION TEMPERATURE         |
| GS                           | GS             | .INTERFEROMETERS                      |                                |
|                              |                | .#PHASE SWITCHING INTERFEROMETERS     |                                |
| RT                           | RT             | RADIO ASTRONOMY                       |                                |
|                              |                | RADIO TELESCOPES                      |                                |
|                              |                |                                       |                                |
| RT                           | RT             | PHASE TRANSFORMATIONS                 | PHASE VELOCITY                 |
|                              |                | 1701                                  | 2304 2308 2402                 |
|                              |                | GS                                    | RATES (PER TIME)               |
|                              |                | .#PHASE TRANSFORMATIONS               | #PHASE VELOCITY                |
|                              |                | .FREEZING                             | VELOCITY                       |
|                              |                | ...VIBRATIONAL FREEZING               | #PHASE VELOCITY                |
|                              |                | ...ZONE MELTING                       | ELECTROMAGNETIC RADIATION      |
|                              |                | ...LIQUEFACTION                       | GROUP VELOCITY                 |
|                              |                | ...COAL LIQUEFACTION                  | LANDAU DAMPING                 |
|                              |                | ...MARTENSITIC TRANSFORMATION         | PROPAGATION VELOCITY           |
|                              |                | ...MELTING                            | QUANTUM MECHANICS              |
|                              |                | ...ARC MELTING                        | TRAVELING WAVES                |
|                              |                | ...FUSION (MELTING)                   | WAVE FRONTS                    |
|                              |                | ...LEVITATION MELTING                 | WAVE PROPAGATION               |
|                              |                | ...VACUUM MELTING                     |                                |
|                              |                | ...VAPORIZING                         |                                |
|                              |                | ...BOILING                            |                                |
|                              |                | ...FILM BOILING                       | PHASE-SPACE INTEGRAL           |
|                              |                | ...NUCLEATE BOILING                   | 1902 2308 2402                 |
|                              |                | ...LEIDENFROST PHENOMENON             | GS                             |
|                              |                | ...EVAPORATION                        | ANALYSIS (MATHEMATICS)         |
|                              |                | ...EVAPOTRANSPIRATION                 | #PHASE-SPACE INTEGRAL          |
|                              |                | ...PROPELLANT EVAPORATION             | CLASSICAL MECHANICS            |
|                              |                | ...TRANSPIRATION                      | EUCLEIDEAN GEOMETRY            |
|                              |                | ...FLASHING (VAPORIZING)              | HYPERSPACES                    |
|                              |                | ...PREVAPORIZATION                    | STATE VECTORS                  |
|                              |                | ...SUBLIMATION                        | PHASED ARRAYS                  |
|                              |                | COLD HARDENING                        | 0701 0901 1001                 |
|                              |                |                                       | GS                             |
|                              |                |                                       | ARRAYS                         |
|                              |                |                                       | #PHASED ARRAYS                 |
| PHASE SHIFT CIRCUITS         | 0902           |                                       |                                |
| GS                           | GS             | CIRCUITS                              |                                |
|                              |                | .#PHASE SHIFT CIRCUITS                |                                |
|                              |                | ...CIRCULATORS (PHASE SHIFT CIRCUITS) |                                |
| RT                           | RT             | DELAY CIRCUITS                        |                                |
|                              |                | DUPLEX OPERATION                      |                                |
|                              |                | GYRATORS                              |                                |
|                              |                |                                       |                                |
| PHASE SHIFT KEYING           | 0702 1001 2402 |                                       |                                |
| GS                           | GS             | CODING                                |                                |
|                              |                | .SIGNAL ENCODING                      |                                |
|                              |                | ...PHASE MODULATION                   |                                |
|                              |                | ...#PHASE SHIFT KEYING                |                                |
|                              |                | ...BINARY PHASE SHIFT KEYING          |                                |
|                              |                | ...QUADRATURE PHASE SHIFT KEYING      |                                |
|                              |                | KEYING                                |                                |
|                              |                | #PHASE SHIFT KEYING                   |                                |
|                              |                | ...BINARY PHASE SHIFT KEYING          |                                |
|                              |                | ...QUADRATURE PHASE SHIFT KEYING      |                                |

RT ANTENNA ARRAYS  
LASER ARRAYS  
LINEAR ARRAYS  
MONOPULSE ANTENNAS  
SEISMOGRAPHS  
STEERABLE ANTENNAS

% PHASES  
0710 1002 2306 2309 2312 3001 3006  
3008  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT CYCLES  
LIQUID PHASES  
LUNAR PHASES  
PHASE SHIFT  
PHASE STABILITY (MATERIALS)  
PHASE TRANSFORMATIONS  
SOLID PHASES  
TERMINATOR LINES  
VAPOR PHASES

PHENACETIN  
USE ACETANILIDE

PHENANTHRENE  
0603 1808  
GS ISOMERS  
#PHENANTHRENE  
ORGANIC COMPOUNDS  
.HYDROCARBONS  
.#PHENANTHRENE  
RT ANTHRACENE  
DYES

PHENOBARBITAL  
0405 1808  
RT DRUGS  
NARCOTICS  
SEDATIVES

PHENOL FORMALDEHYDE  
0603 1808  
RT FORMALDEHYDE  
PHENOLIC RESINS  
RESINS

PHENOLIC EPOXY RESINS  
1809  
GS PLASTICS  
.SYNTHETIC RESINS  
..THERMOSETTING RESINS  
...EPOXY RESINS  
...#PHENOLIC EPOXY RESINS

...PHENOLIC RESINS  
...#PHENOLIC EPOXY RESINS  
RESINS  
.SYNTHETIC RESINS  
..THERMOSETTING RESINS  
...EPOXY RESINS  
...#PHENOLIC EPOXY RESINS  
...#PHENOLIC EPOXY RESINS  
ADHESIVES  
AMINES  
CROSSLINKING

RT

PHENOLIC RESINS  
0603 1808  
GS PLASTICS  
.SYNTHETIC RESINS  
..THERMOSETTING RESINS  
...#PHENOLIC RESINS  
....MICARTA  
....PHENOLIC EPOXY RESINS  
RESINS  
.SYNTHETIC RESINS  
..THERMOSETTING RESINS  
...#PHENOLIC RESINS  
....MICARTA  
....PHENOLIC EPOXY RESINS  
CARBON-PHENOLIC COMPOSITES  
PHENOL FORMALDEHYDE

RT

PHENOLOGY  
0401 2001 2003  
RT ACTIVITY CYCLES (BIOLOGY)  
BIOMETEOROLOGY  
CLIMATOLOGY  
COASTAL ECOLOGY  
ECOLOGY  
MIGRATION  
MOLTING  
PHENOMENOLOGY  
RHYTHM (BIOLOGY)

PHENOLS  
0603 1808  
GS HYDROXYL COMPOUNDS  
.ALCOHOLS  
.#PHENOLS  
...BISPHENOLS  
...CRESOLS  
...PHLOROGLUCINOL  
...THYMOL  
RT THIOLS

PHENOMENOLOGY  
0410

RT CASE HISTORIES  
EXPERIMENTATION  
MEDICAL PHENOMENA  
MESOSCALE PHENOMENA  
PHENOLOGY

PHENOTHIAZINES  
0603 1808  
GS ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
..HETEROCYCLIC COMPOUNDS  
...AZINES  
...#PHENOTHIAZINES  
PYRAZINES  
.AZINES  
.#PHENOTHIAZINES

PHENYLALANINE  
0603 1808  
GS ACIDS  
.AMINO ACIDS  
..ALANINE  
...#PHENYLALANINE  
ORGANIC COMPOUNDS  
.AMINO ACIDS  
..ALANINE  
...#PHENYLALANINE

PHENYLS  
0603 1808  
GS #PHENYLS  
.POLYBROMINATED BIPHENYLS  
.POLYCHLORINATED BIPHENYLS  
.POLYPHENYLS  
..TETRAPHENYLS  
..TRIPHENYLS  
.TERPHENYLS  
PHOSPHENE  
PROPARGYL GROUPS

RT

PHILCO 2000 COMPUTER  
0801 0802  
GS DATA PROCESSING EQUIPMENT  
.COMPUTERS  
..DIGITAL COMPUTERS  
...#PHILCO 2000 COMPUTER

PHILIPPINES  
1305  
GS LANDFORMS  
.ISLANDS  
..PACIFIC ISLANDS  
...#PHILIPPINES  
NATIONS  
#PHILIPPINES

## NASA THESAURUS HIERARCHICAL UPDATE

|                              |    |                 |                           |
|------------------------------|----|-----------------|---------------------------|
| PHILIPS IONIZATION GAGES     | RT | SATURN (PLANET) | SPEECH DEFECTS            |
| 0905 1406 1804 2307          |    |                 | SPEECH RECOGNITION        |
| GS MEASURING INSTRUMENTS     |    |                 | WORDS (LANGUAGE)          |
| .PRESSURE GAGES              |    |                 |                           |
| ..VACUUM GAGES               |    |                 | PHONETICS                 |
| ...IONIZATION GAGES          |    |                 | 0410 3405                 |
| ...#PHILIPS IONIZATION GAGES |    |                 | GS SPEECH                 |
| VACUUM APPARATUS             |    |                 | #PHONETICS                |
| .VACUUM GAGES                |    |                 | RT ACOUSTICS              |
| ..IONIZATION GAGES           |    |                 | INTELLIGIBILITY           |
| ..#PHILIPS IONIZATION GAGES  |    |                 | LANGUAGES                 |
| ..PRESSURE MEASUREMENT       |    |                 | PHONEMES                  |
|                              |    |                 | PHONEMICS                 |
| PHILOSOPHY                   |    |                 | SPEECH DEFECTS            |
| 0410 3402 3403               |    |                 | SPEECH RECOGNITION        |
| GS KNOWLEDGE                 |    |                 | VERBAL COMMUNICATION      |
| #PHILOSOPHY                  |    |                 | WORDS (LANGUAGE)          |
| ..PARADOXES                  |    |                 |                           |
| RT LITERATURE                |    |                 | PHONARTERIOGRAPHY         |
| % LOGIC                      |    |                 | 0405 0501                 |
| MATHEMATICAL LOGIC           |    |                 | RT ARTERIES               |
|                              |    |                 | BLOOD CIRCULATION         |
| PHILOROGLUCINOL              |    |                 | PHONOCARDIOGRAPHY         |
| 0601 1407 1808               |    |                 |                           |
| GS HYDROXYL COMPOUNDS        |    |                 | PHONOCARDIOGRAMS          |
| .ALCOHOLS                    |    |                 | USE PHONOCARDIOGRAPHY     |
| ..PHENOLS                    |    |                 |                           |
| ..#PHILOROGLUCINOL           |    |                 | PHONOCARDIOGRAPHY         |
| RT CHEMICAL INDICATORS       |    |                 | 0404 0405 0501            |
| RESINS                       |    |                 | UF PHONOCARDIOGRAMS       |
|                              |    |                 | VIBROCARDIOGRAPHY         |
| PHOBIAS                      |    |                 | GS BIOENGINEERING         |
| 0408 0410 0502               |    |                 | .BIOMETRICS               |
| GS #PHOBIAS                  |    |                 | ..CARDIOGRAPHY            |
| .FEAR                        |    |                 | ..#PHONOCARDIOGRAPHY      |
| ..FEAR OF FLYING             |    |                 | ....ECHOGRAPHY            |
| RT ANXIETY                   |    |                 | BALLISTOCARDIOGRAPHY      |
| EMOTIONAL FACTORS            |    |                 | ELECTROCARDIOGRAPHY       |
|                              |    |                 | HEART                     |
| PHOBOS                       |    |                 | HEART DISEASES            |
| 3006 3008                    |    |                 | PHONARTERIOGRAPHY         |
| GS CELESTIAL BODIES          |    |                 | VECTORCARDIOGRAPHY        |
| .NATURAL SATELLITES          |    |                 |                           |
| ..MARS SATELLITES            |    |                 | PHONON BEAMS              |
| ..#PHOBOS                    |    |                 | 2402 2403 2405            |
| RT DEIMOS                    |    |                 | GS BEAMS (RADIATION)      |
| MARS (PLANET)                |    |                 | #PHONON BEAMS             |
|                              |    |                 | ELASTIC WAVES             |
|                              |    |                 | .PHONONS                  |
| PHOEBE                       |    |                 | .#PHONON BEAMS            |
| 3006 3008                    |    |                 | ELECTROMAGNETIC RADIATION |
| GS CELESTIAL BODIES          |    |                 | .THERMAL RADIATION        |
| .NATURAL SATELLITES          |    |                 | .#PHONON BEAMS            |
| ..SATURN SATELLITES          |    |                 | ELEMENTARY EXCITATIONS    |
| ..#PHOEBE                    |    |                 |                           |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

. FUEL CELLS  
 .#PHOSPHORIC ACID FUEL CELLS  
 .BIOCHEMICAL FUEL CELLS  
 .ELECTROLYTIC CELLS  
 .ENERGY TECHNOLOGY  
 .HYDROGEN OXYGEN FUEL CELLS  
 .REGENERATIVE FUEL CELLS  
 .TOTAL ENERGY SYSTEMS

RT

PHOSPHORS  
 O605 1704 1805  
 GS #PHOSPHORS  
 .RADIOPHOSPHORS  
 .FLUORESCENCE  
 .IMAGE INTENSIFIERS  
 .LASER INDUCED FLUORESCENCE  
 .MERCURY LAMPS  
 .PHOSPHORESCENCE  
 .PHOTOGRAPHIC FILM

PHOSPHORS  
 O603 1807  
 GS  
 .CHEMICAL ELEMENTS  
 .#PHOSPHORUS  
 .PHOSPHORUS ISOTOPES  
 .PHOSPHORUS 32

PHOSPHORUS COMPOUNDS  
 O603 1804 1808  
 GS #PHOSPHORUS COMPOUNDS  
 .DIETHYL HYDROGEN PHOSPHITE (DEHP)  
 .ORGANIC PHOSPHORUS COMPOUNDS  
 .PHOSPHAZENE  
 .PHOSPHENE  
 .PHOSPHONITRILES  
 .URIDYLIC ACID  
 .PHOSPHATES  
 .ADENINES  
 .ADENOSINE TRIPHOSPHATE  
 .AMMONIUM PHOSPHATES  
 .CALCIUM PHOSPHATES  
 .CYCLIC AMP  
 .DIPHOSPHATES  
 .ADENOSINE DIPHOSPHATE  
 .INDIUM PHOSPHATES  
 .MONAZITE SANDS  
 .PHOSPHENE  
 .POLYNUCLEOTIDES  
 .POTASSIUM PHOSPHATES  
 .PYRIDINE NUCLEOTIDES  
 .URIDYLIC ACID  
 .PHOSPHIDES  
 .BORON PHOSPHIDES  
 .GALLIUM PHOSPHIDES  
 .INDIUM PHOSPHIDES

PHOSPHORUS METABOLISM  
 O402 0404 0409  
 GS  
 .METABOLISM  
 .#PHOSPHORUS METABOLISM

PHOSPHORUS OXIDES  
 O603 1804  
 GS  
 .CHALCOGENIDES  
 .OXIDES  
 .#PHOSPHORUS OXIDES  
 .PHOSPHORUS COMPOUNDS  
 .PHOSPHORUS OXIDES

PHOSPHORUS POLYMERS  
 O603 1804 1810  
 GS  
 .PHOSPHORUS COMPOUNDS  
 .#PHOSPHORUS POLYMERS  
 .RT % POLYMERS

PHOSPHORUS 32  
 O603 1807 2406  
 GS  
 .CHEMICAL ELEMENTS  
 .NUCLIDES  
 .ISOTOPES  
 .#PHOSPHORUS ISOTOPES  
 .#PHOSPHORUS 32  
 .RADIOACTIVE ISOTOPES  
 .#PHOSPHORUS 32  
 .PHOSPHORUS  
 .#PHOSPHORUS ISOTOPES  
 .#PHOSPHORUS 32

PHOSPHORYLATION  
 O602

.MANGANESE PHOSPHIDES  
 .SCHREIBERSITE  
 .PHOSPHINES  
 .PHOSPHONIUM COMPOUNDS  
 .PHOSPHONIC ACID  
 .PHOSPHORUS OXIDES  
 .PHOSPHORUS POLYMERS  
 .CHEMICAL COMPOUNDS  
 .GROUP 5A COMPOUNDS

PHOSPHORUS ISOTOPES  
 2406  
 GS  
 .CHEMICAL ELEMENTS  
 .NUCLIDES  
 .ISOTOPES  
 .#PHOSPHORUS ISOTOPES  
 .PHOSPHORUS 32  
 .PHOSPHORUS  
 .PHOSPHORUS ISOTOPES  
 .PHOSPHORUS 32

PHOSPHORUS METABOLISM  
 O402 0404 0409  
 GS  
 .METABOLISM  
 .#PHOSPHORUS METABOLISM

PHOSPHORUS OXIDES  
 O603 1804  
 GS  
 .CHALCOGENIDES  
 .OXIDES  
 .#PHOSPHORUS OXIDES  
 .PHOSPHORUS COMPOUNDS  
 .PHOSPHORUS OXIDES

PHOSPHORUS POLYMERS  
 O603 1804 1810  
 GS  
 .PHOSPHORUS COMPOUNDS  
 .#PHOSPHORUS POLYMERS  
 .RT % POLYMERS

PHOSPHORUS 32  
 O603 1807 2406  
 GS  
 .CHEMICAL ELEMENTS  
 .NUCLIDES  
 .ISOTOPES  
 .#PHOSPHORUS ISOTOPES  
 .#PHOSPHORUS 32  
 .RADIOACTIVE ISOTOPES  
 .#PHOSPHORUS 32  
 .PHOSPHORUS  
 .#PHOSPHORUS ISOTOPES  
 .#PHOSPHORUS 32

PHOSPHORYLATION  
 O602

GS  
 .CHEMICAL REACTIONS  
 .PHOSPHORYLATION

PHOTICS  
 O411 2306 2310  
 RT  
 .LIGHT (VISIBLE RADIATION)  
 .OPTICS

PHOTO RECONNAISSANCE SPACECRAFT  
 1401 1407 3110  
 GS  
 .MILITARY SPACECRAFT  
 .RECONNAISSANCE SPACECRAFT  
 .PHOTO RECONNAISSANCE SPACECRAFT  
 .SPACECRAFT

PHOTOABSORPTION  
 O603 0605 2306  
 GS  
 .ENERGY ABSORPTION  
 .RADIATION ABSORPTION  
 .ELECTROMAGNETIC ABSORPTION  
 .PHOTOABSORPTION  
 .ABSORPTION  
 .PHOTOEXCITATION

PHOTOACOUSTIC MICROSCOPY  
 O501  
 GS  
 .MICROSCOPY  
 .PHOTOACOUSTIC MICROSCOPY  
 .ACOUSTIC MICROSCOPES  
 .ACUSTO-OPTICS  
 .CERAMICS  
 .NONDESTRUCTIVE TESTS  
 .PHOTOACOUSTIC SPECTROSCOPY

PHOTOACOUSTIC SPECTROSCOPY  
 1411  
 GS  
 .SPECTROSCOPY  
 .PHOTOACOUSTIC SPECTROSCOPY  
 .ABSORPTION SPECTRA  
 .ABSORPTIVITY  
 .ACUSTO-OPTICS  
 .LASER APPLICATIONS  
 .LASER SPECTROSCOPY  
 .PHOTOACOUSTIC MICROSCOPY

PHOTOCATHODES  
 O902 0905 1413 2306  
 UF  
 .PHOTOELECTRIC CATHODES  
 .ELECTRODES  
 .CATHODES  
 .TUBE CATHODES  
 .PHOTOCATHODES  
 .ELECTRODE MATERIALS  
 .IMAGE CONVERTERS  
 .IMAGE INTENSIFIERS

IMAGE ORTHICONS  
 LIGHT AMPLIFIERS  
 MICROCHANNELS  
 ORTHICONS  
 PHOTOELECTRIC CELLS  
 PHOTOELECTRIC EMISSION  
 PHOTOELECTRIC MATERIALS  
 PHOTOMULTIPLIER TUBES  
  
 PHOTOCCELLS  
   USE PHOTOELECTRIC CELLS  
  
 PHOTOCHEMICAL OXIDANTS  
   O601  
   GS OXIDIZERS  
     #PHOTOCHEMICAL OXIDANTS  
   RT AIR POLLUTION  
     ATMOSPHERIC CHEMISTRY  
     NITROGEN OXIDES  
     OZONE  
     PHOTOOXIDATION  
  
 PHOTOCHEMICAL REACTIONS  
   O602 O605 1407 2306  
   UF PHOTOCHEMISTRY  
     PHOTOREDUCTION  
   GS #PHOTOCHEMICAL REACTIONS  
     ..PHOTOCHROMISM  
     ..PHOTODECOMPOSITION  
     ..PHOTOLYSIS  
     ..PHOTOSYNTHESIS  
     ..RADIOLYSIS  
   RT ASSOCIATION REACTIONS  
     ATMOSPHERIC CHEMISTRY  
     CHARGE TRANSFER  
     SODALITE  
  
 PHOTOCHEMISTRY  
   USE PHOTOCHEMICAL REACTIONS  
  
 PHOTOCHROMISM  
   O605 1407 2306  
   GS CHEMICAL REACTIONS  
     .PHOTOCHEMICAL REACTIONS  
     ..PHOTOCHROMISM  
   RT COLOR PHOTOGRAPHY  
     SODALITE  
  
 PHOTOCUCLINOMETRY  
   USE PHOTOGRAMMETRY  
  
 PHOTOCONDUCTIVE CELLS  
   O605 1413 2306 2308  
   GS PHOTOELECTRIC CELLS

#PHOTOCONDUCTIVE CELLS  
 RT % CELLS  
 PHOTOVOLTAIC CELLS  
  
 PHOTOCONDUCTIVITY  
   O605 2302 2304 2308 3408  
   UF PHOTORESISTIVITY  
   GS ELECTRICAL PROPERTIES  
     ELECTRICAL RESISTIVITY  
     .ELECTRICAL RESISTIVITY  
     .PHOTOCONDUCTIVITY  
     ELECTROMAGNETIC PROPERTIES  
     .OPTICAL PROPERTIES  
     ..PHOTOCONDUCTIVITY  
     PHOTOELECTRICITY  
     .PHOTOELECTRIC EFFECT  
     ..PHOTOCONDUCTIVITY  
     TRANSPORT PROPERTIES  
     .ELECTRICAL RESISTIVITY  
     ..PHOTOCONDUCTIVITY  
     ..CONDUCTIVITY  
   RT % CONDUCTIVITY  
     MERCURY CADMIUM TELLURIDES  
     PHOTOCONDUCTORS  
     SQUARE WELLS  
  
 PHOTOCONDUCTORS  
   O605 O905 1413 2302 2304 2308  
   UF PHOTORESISTORS  
   GS CONDUCTORS  
     #PHOTOCONDUCTORS  
     SEMICONDUCTORS (MATERIALS)  
     #PHOTOCONDUCTORS  
   RT MERCURY CADMIUM TELLURIDES  
     PHOTOCONDUCTIVITY  
     PHOTODIODES  
     PHOTOELECTRIC CELLS  
     PHOTOELECTRIC MATERIALS  
     PHOTOMETERS  
     PHOTOTRANSISTORS  
     RESISTORS  
     TUNNEL JUNCTIONS  
  
 PHOTOCURRENTS  
   USE ELECTRIC CURRENT  
     PHOTOELECTRIC EMISSION  
  
 PHOTODECOMPOSITION  
   O605 2306 2405  
   GS CHEMICAL REACTIONS  
     .PHOTOCHEMICAL REACTIONS  
     ..PHOTODECOMPOSITION  
     DECOMPOSITION  
     #PHOTODECOMPOSITION  
     RADIATION CHEMISTRY  
     #PHOTODECOMPOSITION  
   RT ELECTROMAGNETIC ABSORPTION

PHOTODETACHMENT  
 PHOTOLYSIS  
  
 PHOTODETACHMENT  
   O602 O605 O902 1407 2306  
   RT PHOTODECOMPOSITION  
     PHOTOIONIZATION  
  
 PHOTODETECTORS  
   USE PHOTOMETERS  
  
 PHOTODIODES  
   O906 1413 2306  
   GS ELECTRONIC EQUIPMENT  
     .DIODES  
     ..SEMICONDUCTOR DIODES  
     ..#PHOTODIODES  
     .SOLID STATE DEVICES  
     ..SEMICONDUCTOR DEVICES  
     ..#PHOTODIODES  
     OPTOELECTRONIC DEVICES  
     #PHOTODIODES  
   RT FOCAL PLANE DEVICES  
     ION IMPLANTATION  
     LASERS  
     MERCURY CADMIUM TELLURIDES  
     MSM (SEMICONDUCTORS)  
     PHOTOCONDUCTORS  
     PHOTOELECTRIC CELLS  
     PHOTOELECTRIC MATERIALS  
     PHOTOTRANSISTORS  
     PHOTOTUBES  
     PUSHROOM SENSOR MODES  
     SIS (SEMICONDUCTORS)  
     SOLAR CELLS  
     X RAY DETECTORS  
  
 PHOTODISSOCIATION  
   O602 O605 2306  
   GS DECOMPOSITION  
     #PHOTODISSOCIATION  
     DISSOCIATION  
     #PHOTODISSOCIATION  
     RADIATION CHEMISTRY  
     #PHOTODISSOCIATION  
     ELECTROMAGNETIC ABSORPTION  
   RT PHOTOEXCITATION  
     PHOTOLYSIS  
  
 PHOTOELASTIC ANALYSIS  
   1406 2306 2310 3203 3501  
   UF PHOTOELASTIC STRESS MEASUREMENT  
   RT FRINGE MULTIPLICATION  
     MOIRE EFFECTS  
     % OPTICS



# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |  |  |  |
|------------------------------------|--|--|--|
| PHOTOGRAPHIC MEASUREMENT           |  |  |  |
| % POLARIZATION                     |  |  |  |
| POLARIZATION (WAVES)               |  |  |  |
| STRESS ANALYSIS                    |  |  |  |
| STRESS MEASUREMENT                 |  |  |  |
| TEMPERATURE INVERSIONS             |  |  |  |
| PHOTOELASTIC MATERIALS             |  |  |  |
| 2306 2310 2601                     |  |  |  |
| RT % MATERIALS                     |  |  |  |
| PHOTOELASTICITY                    |  |  |  |
| PHOTOELASTIC STRESS MEASUREMENT    |  |  |  |
| USE PHOTOELASTIC ANALYSIS          |  |  |  |
| PHOTOELASTICITY                    |  |  |  |
| 2306 2310 2601                     |  |  |  |
| GS ELECTROMAGNETIC PROPERTIES      |  |  |  |
| #PHOTOELASTICITY                   |  |  |  |
| ..PHOTOVISCOELASTICITY             |  |  |  |
| MECHANICAL PROPERTIES              |  |  |  |
| .ELASTIC PROPERTIES                |  |  |  |
| .#PHOTOELASTICITY                  |  |  |  |
| ...PHOTOVISCOELASTICITY            |  |  |  |
| BIREFRINGENCE                      |  |  |  |
| DICHROISM                          |  |  |  |
| PHOTOELASTIC MATERIALS             |  |  |  |
| POLARIZED LIGHT                    |  |  |  |
| PRISMS                             |  |  |  |
| REFRACTION                         |  |  |  |
| STRESS ANALYSIS                    |  |  |  |
| PHOTOELECTRIC CATHODES             |  |  |  |
| USE PHOTOCATHODES                  |  |  |  |
| PHOTOELECTRIC CELLS                |  |  |  |
| 0301 1413 2304 2306                |  |  |  |
| UF PHOTOCELLS                      |  |  |  |
| GS #PHOTOELECTRIC CELLS            |  |  |  |
| .PHOTOCONDUCTIVE CELLS             |  |  |  |
| .PHOTOVOLTAIC CELLS                |  |  |  |
| ..SOLAR CELLS                      |  |  |  |
| ...VERTICAL JUNCTION SOLAR CELLS   |  |  |  |
| RT % CELLS                         |  |  |  |
| DIRECT POWER GENERATORS            |  |  |  |
| % ELECTRIC CELLS                   |  |  |  |
| ELECTROCHEMICAL CELLS              |  |  |  |
| ELECTRODE MATERIALS                |  |  |  |
| ENERGY ABSORPTION FILMS            |  |  |  |
| PHOTOCATHODES                      |  |  |  |
| PHOTOCONDUCTORS                    |  |  |  |
| PHOTODIODES                        |  |  |  |
| PHOTOMETERS                        |  |  |  |
| PHOTOMULTIPLIER TUBES              |  |  |  |
| PHOTOTRANSISTORS                   |  |  |  |
| PHOTOTUBES                         |  |  |  |
| SOLAR GENERATORS                   |  |  |  |
| TRANSUDERS                         |  |  |  |
| PHOTOELECTRIC EFFECT               |  |  |  |
| 0605 2304 2306                     |  |  |  |
| GS #PHOTOELECTRICITY               |  |  |  |
| .PHOTOELECTRIC EFFECT              |  |  |  |
| ..PHOTOCONDUCTIVITY                |  |  |  |
| ..PHOTOELECTRIC EMISSION           |  |  |  |
| ..PHOTOIONIZATION                  |  |  |  |
| ..PHOTOVOLTAIC EFFECT              |  |  |  |
| RT % EFFECTS                       |  |  |  |
| PHOTOELECTRONS                     |  |  |  |
| PHOTOELECTRIC EMISSION             |  |  |  |
| 2306 2402 2405                     |  |  |  |
| UF PHOTOCURRENTS                   |  |  |  |
| PHOTOEMISSION                      |  |  |  |
| PHOTOEMISSIVITY                    |  |  |  |
| EMISSION                           |  |  |  |
| .PARTICLE EMISSION                 |  |  |  |
| ..ELECTRON EMISSION                |  |  |  |
| ..#PHOTOELECTRIC EMISSION          |  |  |  |
| PHOTOELECTRICITY                   |  |  |  |
| .PHOTOELECTRIC EFFECT              |  |  |  |
| .#PHOTOELECTRIC EMISSION           |  |  |  |
| EXTERNAL SURFACE CURRENTS          |  |  |  |
| NEGATIVE ELECTRON AFFINITY         |  |  |  |
| PHOTOCATHODES                      |  |  |  |
| PHOTOEXCITATION                    |  |  |  |
| PHOTOIONIZATION                    |  |  |  |
| PHOTOPEAK                          |  |  |  |
| PHOTOVOLTAGES                      |  |  |  |
| PHOTOVOLTAIC EFFECT                |  |  |  |
| STIMULATED EMISSION                |  |  |  |
| WORK FUNCTIONS                     |  |  |  |
| PHOTOELECTRIC GENERATORS           |  |  |  |
| 0301 0605 2310                     |  |  |  |
| GS ELECTRIC GENERATORS             |  |  |  |
| .DIRECT POWER GENERATORS           |  |  |  |
| .#PHOTOELECTRIC GENERATORS         |  |  |  |
| ...PHOTOVOLTAIC CELLS              |  |  |  |
| ....SOLAR CELLS                    |  |  |  |
| .....VERTICAL JUNCTION SOLAR CELLS |  |  |  |
| RT % GENERATORS                    |  |  |  |
| PHOTOELECTROCHEMICAL DEVICES       |  |  |  |
| SOLAR ENERGY CONVERSION            |  |  |  |
| SOLAR GENERATORS                   |  |  |  |
| THERMOELECTRIC GENERATORS          |  |  |  |
| PHOTOELECTRIC MATERIALS            |  |  |  |
| 0605 2306 2602                     |  |  |  |
| PHOTOEMITTERS                      |  |  |  |
| ELECTRODE MATERIALS                |  |  |  |
| ELECTRON EMISSION                  |  |  |  |
| % MATERIALS                        |  |  |  |
| PHOTOCATHODES                      |  |  |  |
| PHOTOCONDUCTORS                    |  |  |  |
| PHOTODIODES                        |  |  |  |
| PHOTOELECTRICITY                   |  |  |  |
| PHOTOELECTRIC EFFECT               |  |  |  |
| ..PHOTOCONDUCTIVITY                |  |  |  |
| ..PHOTOELECTRIC EMISSION           |  |  |  |
| ..PHOTOIONIZATION                  |  |  |  |
| ..PHOTOVOLTAIC EFFECT              |  |  |  |
| RT % EFFECTS                       |  |  |  |
| PHOTOELECTRONS                     |  |  |  |
| PHOTOELECTRIC PHOTOMETERS          |  |  |  |
| USE ELECTROPHOTOMETERS             |  |  |  |
| PHOTOELECTRICITY                   |  |  |  |
| 0605 2304 2306                     |  |  |  |
| UF PHOTOELECTRONICS                |  |  |  |
| PHOTOSENSORS                       |  |  |  |
| GS #PHOTOELECTRICITY               |  |  |  |
| .PHOTOELECTRIC EFFECT              |  |  |  |
| ..PHOTOCONDUCTIVITY                |  |  |  |
| ..PHOTOELECTRIC EMISSION           |  |  |  |
| ..PHOTOIONIZATION                  |  |  |  |
| ..PHOTOVOLTAIC EFFECT              |  |  |  |
| RT COMPTON EFFECT                  |  |  |  |
| ELECTRICAL PROPERTIES              |  |  |  |
| ELECTRICITY                        |  |  |  |
| OPTICAL PROPERTIES                 |  |  |  |
| PHOTOELECTRIC MATERIALS            |  |  |  |
| PHOTOELECTRONS                     |  |  |  |
| PHOTOVOLTAGES                      |  |  |  |
| PHOTOELECTROCHEMICAL DEVICES       |  |  |  |
| 2310                               |  |  |  |
| RT % DEVICES                       |  |  |  |
| ELECTROCHEMICAL CELLS              |  |  |  |
| ELECTRODE MATERIALS                |  |  |  |
| ENERGY TECHNOLOGY                  |  |  |  |
| PHOTOELECTRIC GENERATORS           |  |  |  |
| PHOTOELECTROCHEMISTRY              |  |  |  |
| PHOTON BEAMS                       |  |  |  |
| SOLAR ENERGY CONVERSION            |  |  |  |
| PHOTOELECTROCHEMISTRY              |  |  |  |
| 0603                               |  |  |  |
| GS ELECTROCHEMISTRY                |  |  |  |
| #PHOTOELECTROCHEMISTRY             |  |  |  |
| RT % CHEMISTRY                     |  |  |  |
| PHOTOELECTROCHEMICAL DEVICES       |  |  |  |
| PHOTOELECTROMAGNETIC DETECTORS     |  |  |  |
| USE PHOTOELECTROMAGNETIC EFFECTS   |  |  |  |
| RADIATION MEASURING INSTRUMENTS    |  |  |  |

PHOTOELECTROMAGNETIC EFFECTS  
 2306 2402 2405  
 UF PHOTOELECTROMAGNETIC DETECTORS  
 RT % EFFECTS  
 EXCITONS  
 INTERMETALLICS

PHOTOELECTRON SPECTROSCOPY  
 1411  
 GS SPECTROSCOPY  
 #PHOTOELECTRON SPECTROSCOPY  
 RT ELECTRON EMISSION  
 SPECTROSCOPIC ANALYSIS

PHOTOELECTRONICS  
 USE ELECTRONICS  
 PHOTOELECTRICITY

PHOTOELECTRONS  
 2306 2403 2405  
 GS PARTICLES  
 .NUCLEAR PARTICLES  
 .#PHOTOELECTRONS  
 ELECTRON EMISSION  
 PHOTOELECTRIC EFFECT  
 PHOTOELECTRIC MATERIALS  
 PHOTOELECTRICITY  
 PHOTOIONIZATION  
 PHOTOMAGNETIC EFFECTS  
 PHOTONEUTRONS  
 PHOTONUCLEAR REACTIONS  
 PHOTOVOLTAIC EFFECT

PHOTOEMISSION  
 USE PHOTOELECTRIC EMISSION

PHOTOEMISSIVITY  
 USE EMISSIVITY  
 PHOTOELECTRIC EMISSION

PHOTOEMITTERS  
 USE PHOTOELECTRIC MATERIALS

PHOTOENGRAVING  
 0605 1407 3404 3405  
 RT MICROMACHINING  
 PHOTO MECHANICAL EFFECT  
 PRINTING

PHOTOEXCITATION  
 2306 2308 2402 2405  
 GS EXCITATION  
 #PHOTOEXCITATION  
 RT FLUORESCENCE

MOLECULAR EXCITATION  
 PHOTOABSORPTION  
 PHOTODISSOCIATION  
 PHOTOELECTRIC EMISSION  
 PHOTOIONIZATION  
 PHOTOLUMINESCENCE

PHOTOGEOLGY  
 0605 1306 1407  
 GS GEOLOGY  
 #PHOTOGEOLGY  
 RT AERIAL PHOTOGRAPHY  
 EARTH RESOURCES SURVEY AIRCRAFT  
 GEOLOGICAL SURVEYS  
 GEOMORPHOLOGY  
 ICE MAPPING  
 NATURAL GAS EXPLORATION  
 PHOTOGRAMMETRY  
 PHOTOMAPPING  
 RECONNAISSANCE  
 THEMATIC MAPPING

PHOTOGEONIMETERS  
 1406 1407 1902 2306 2310  
 GS MEASURING INSTRUMENTS  
 .GONIOMETERS  
 .#PHOTOGEONIMETERS  
 .OPTICAL MEASURING INSTRUMENTS  
 .#PHOTOGEONIMETERS  
 OPTICAL EQUIPMENT  
 .OPTICAL MEASURING INSTRUMENTS  
 .#PHOTOGEONIMETERS  
 ANGLES (GEOMETRY)  
 DIFFRACTOMETERS  
 ETALONS  
 INTERFEROMETERS  
 MONOCHROMATORS  
 SPECTROMETERS

PHOTOGRAMMETRY  
 1303 1407 3009  
 UF PHOTOCLINOMETRY  
 GS PHOTOGRAPHIC MEASUREMENT  
 #PHOTOGRAMMETRY  
 RT AERIAL PHOTOGRAPHY  
 MAPPING  
 PHOTO GEOLOGY  
 PHOTORECONNAISSANCE  
 PROJECTORS  
 RELIEF MAPS  
 STEREO PHOTOGRAPHY  
 SURVEYS  
 TERRAIN ANALYSIS

PHOTOGRAPH INTERPRETATION

PHOTOGRAPHIC DEVELOPERS  
 0602 0605 1407 1802  
 UF DEVELOPERS (PHOTOGRAPHY)  
 RT % DEVELOPMENT  
 PHOTOGRAPHS  
 PHOTOGRAPHY

PHOTOGRAPHIC EMULSIONS  
 0605 1407 1802  
 GS MIXTURES  
 .DISPERSIONS  
 .EMULSIONS  
 .#PHOTOGRAPHIC EMULSIONS  
 ....NUCLEAR EMULSIONS  
 .SOLUTIONS  
 .#PHOTOGRAPHIC EMULSIONS  
 ....NUCLEAR EMULSIONS

RT PHOTOGRAPHY  
 PHOTOSENSITIVITY

PHOTOGRAPHIC EQUIPMENT  
 1407 1412 2310 3501  
 GS #PHOTOGRAPHIC EQUIPMENT  
 .CAMERAS  
 .BAKER-NUNN CAMERA  
 .BALLISTIC CAMERAS  
 .DELFT CAMERA  
 .DIFFRACTION LIMITED CAMERAS  
 .FAINT OBJECT CAMERA  
 .HIGH SPEED CAMERAS  
 .FRAMING CAMERAS  
 .I2S CAMERAS  
 .LALLEMAND CAMERAS  
 .MULTISPECTRAL BAND CAMERAS  
 .PANORAMIC CAMERAS  
 .PINHOLE CAMERAS  
 .SCHMIDT CAMERAS  
 .STREAK CAMERAS  
 .TELEVISION CAMERAS  
 .PHOTOGRAPHIC PROCESSING EQUIPMENT  
 .PHOTOGRAPHIC RECTIFIERS  
 RT % EQUIPMENT  
 LENSES  
 OPTICAL EQUIPMENT  
 OPTICAL FILTERS  
 PHOTOGRAPHY  
 PHOTOMETERS  
 PROJECTORS

PHOTOGRAPHIC FILM  
 0605 1407 1802 3501  
 GS #PHOTOGRAPHIC FILM  
 .MICROFILMS

|                                       |  |                                     |                |                                 |                 |
|---------------------------------------|--|-------------------------------------|----------------|---------------------------------|-----------------|
| RT % FILMS                            |  | RT                                  | DATA RECORDING | 1407 3009 3501                  | GS #PHOTOGRAPHY |
| MAGAZINES (SUPPLY CHAMBERS)           |  | HIGH SPEED PHOTOGRAPHY              |                | .AERIAL PHOTOGRAPHY             |                 |
| OPTICAL DATA STORAGE MATERIALS        |  | HOLOGRAMMETRY                       |                | .ALL SKY PHOTOGRAPHY            |                 |
| OPTICAL FILTERS                       |  | INTERMITTENCY HYPOTHESIS            |                | .ASTRONOMICAL PHOTOGRAPHY       |                 |
| PHOSPHORS                             |  | PARTICLE IMAGE VELOCIMETRY          |                | .AUTORADIOGRAPHY                |                 |
| PHOTOGRAPHS                           |  | PHOTOGRAPHY                         |                | .BLACK AND WHITE PHOTOGRAPHY    |                 |
| POLYMERIC FILMS                       |  | RECORDING INSTRUMENTS               |                | .CHRONOPHOTOGRAPHY              |                 |
| SABATIER REACTION                     |  |                                     |                | .CINEMATOGRAPHY                 |                 |
|                                       |  |                                     |                | .CLOUD PHOTOGRAPHY              |                 |
| PHOTOGRAPHIC MEASUREMENT              |  | PHOTOGRAPHIC RECTIFIERS             |                | .COLOR PHOTOGRAPHY              |                 |
| 1406 1407 3501                        |  | 0501 1411 1412 2310                 |                | .ELECTRO-OPTICAL PHOTOGRAPHY    |                 |
| GS #PHOTOGRAPHIC MEASUREMENT          |  | GS OPTICAL EQUIPMENT                |                | .ELECTRON PHOTOGRAPHY           |                 |
| .PHOTOGRAMMETRY                       |  | #PHOTOGRAPHIC RECTIFIERS            |                | .FRAC TOGRAPHY                  |                 |
| RT DOSIMETERS                         |  | PHOTOGRAPHIC EQUIPMENT              |                | .FRAME PHOTOGRAPHY              |                 |
| % MEASUREMENT                         |  | #PHOTOGRAPHIC RECTIFIERS            |                | .HIGH SPEED PHOTOGRAPHY         |                 |
| OPTICAL CORRECTION PROCEDURE          |  | RT % CONDENSERS                     |                | .HOLOGRAPHY                     |                 |
| OPTICAL MEASUREMENT                   |  | PHOTOGRAPHY                         |                | .ACOUSTICAL HOLOGRAPHY          |                 |
| PARTICLE IMAGE VELOCIMETRY            |  | PHOTOGRAPHIC TRACKING               |                | .MICROWAVE HOLOGRAPHY           |                 |
| PHOTOELASTIC ANALYSIS                 |  | 0709 1109 1407 3001 3501            |                | .SPECKLE HOLOGRAPHY             |                 |
| PHOTOGRAPHY                           |  | GS TRACKING (POSITION)              |                | .WHITE LIGHT HOLOGRAPHY         |                 |
| PHOTOINTERPRETATION                   |  | #PHOTOGRAPHIC TRACKING              |                | .INFRARED IMAGERY               |                 |
| PHOTOMETRY                            |  | RT CINETHEODOLITES                  |                | .LUNAR PHOTOGRAPHY              |                 |
| PHOTORECONNAISSANCE                   |  | OPTICAL TRACKING                    |                | .METRIC PHOTOGRAPHY             |                 |
| SPECTROMETERS                         |  | PHOTOGRAPHY                         |                | .MICROWAVE PHOTOGRAPHY          |                 |
|                                       |  | SATELLITE TRACKING                  |                | .MULTISPECTRAL PHOTOGRAPHY      |                 |
| PHOTOGRAPHIC PLATES                   |  | SPACE DETECTION AND TRACKING SYSTEM |                | .INFRARED PHOTOGRAPHY           |                 |
| 0605 1407 1802                        |  |                                     |                | .COLOR INFRARED PHOTOGRAPHY     |                 |
| RT GLASS                              |  | PHOTOGRAPHS                         |                | .RADAR PHOTOGRAPHY              |                 |
| PHOTOGRAPHIC PROCESSING               |  | 1407 1412 3009                      |                | .ORTHOPHOTOGRAPHY               |                 |
| PHOTOGRAPHS                           |  | GS #PHOTOGRAPHS                     |                | .PHOTOMICROGRAPHY               |                 |
| % PLATES                              |  | .CLOUD PHOTOGRAPHS                  |                | .ROCKET-BORNE PHOTOGRAPHY       |                 |
|                                       |  | .LUNAR PHOTOGRAPHS                  |                | .SHADOWGRAPH PHOTOGRAPHY        |                 |
| PHOTOGRAPHIC PROCESSING               |  | .MARS PHOTOGRAPHS                   |                | .SCHLIENEN PHOTOGRAPHY          |                 |
| 0602 0605 1407                        |  | .MICROPHOTOGRAPHS                   |                | .SPACEBORNE PHOTOGRAPHY         |                 |
| RT DARKROOMS                          |  | .MOTION PICTURES                    |                | .SATELLITE-BORNE PHOTOGRAPHY    |                 |
| PHOTOGRAPHIC PLATES                   |  | .PHOTOMICROGRAPHS                   |                | .SPECTROPHOTOGRAPHY             |                 |
| PHOTOGRAPHS                           |  | DISPLAY DEVICES                     |                | .STEREOSCOPY                    |                 |
| PRINTING                              |  | IMAGES                              |                | .STEREOPHOTOGRAPHY              |                 |
| % PROCESSING                          |  | MOSAICS                             |                | .STREAK PHOTOGRAPHY             |                 |
|                                       |  | OPTICAL CORRECTION PROCEDURE        |                | .ULTRAVIOLET PHOTOGRAPHY        |                 |
| PHOTOGRAPHIC PROCESSING EQUIPMENT     |  | PHOTOGRAPHIC DEVELOPERS             |                | .ULTRAVIOLET PHOTOMETRY         |                 |
| 1407 1802                             |  | PHOTOGRAPHIC FILM                   |                | .UNDERWATER PHOTOGRAPHY         |                 |
| GS #PHOTOGRAPHIC PROCESSING EQUIPMENT |  | PHOTOGRAPHIC PLATES                 |                | .UROGRAPHY                      |                 |
| RT DARKROOMS                          |  | PHOTOGRAPHIC PROCESSING             |                | BRIGHTNESS DISTRIBUTION         |                 |
| PHOTOGRAPHY                           |  | PHOTOGRAPHIC RECORDING              |                | BRIGHTNESS TEMPERATURE          |                 |
| REPRODUCTION (COPYING)                |  | PHOTOGRAPHY                         |                | CAMERAS                         |                 |
|                                       |  | PIXELS                              |                | CLOUD PHOTOGRAPHS               |                 |
| PHOTOGRAPHIC RECORDING                |  | REPRESENTATIONS                     |                | DARKROOMS                       |                 |
| 1407 3405 3501                        |  | SPATIAL FILTERING                   |                | EARTH OBSERVATIONS (FROM SPACE) |                 |
| GS RECORDING                          |  | VIDEO TAPES                         |                | EARTH RESOURCES                 |                 |
| #PHOTOGRAPHIC RECORDING               |  | VISUAL AIDS                         |                | EVAPOROGRAPHY                   |                 |
|                                       |  | XEROGRAPHY                          |                | EXPOSURE                        |                 |
|                                       |  |                                     |                | GRAPHIC ARTS                    |                 |
|                                       |  |                                     |                | HS-801 AIRCRAFT                 |                 |

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|-----------------------------------|--|--|--|
| ICE MAPPING                       |  |  |  |
| IMAGERY                           |  |  |  |
| IMAGING TECHNIQUES                |  |  |  |
| LUNAR PHOTOGRAPHS                 |  |  |  |
| MAPPING                           |  |  |  |
| MARS PHOTOGRAPHS                  |  |  |  |
| MICROPHOTOGRAPHS                  |  |  |  |
| MULTISPECTRAL BAND CAMERAS        |  |  |  |
| MULTISPECTRAL BAND SCANNERS       |  |  |  |
| PANORAMIC CAMERAS                 |  |  |  |
| PHOTOGRAPHIC DEVELOPERS           |  |  |  |
| PHOTOGRAPHIC EMULSIONS            |  |  |  |
| PHOTOGRAPHIC EQUIPMENT            |  |  |  |
| PHOTOGRAPHIC FILM                 |  |  |  |
| PHOTOGRAPHIC MEASUREMENT          |  |  |  |
| PHOTOGRAPHIC PLATES               |  |  |  |
| PHOTOGRAPHIC PROCESSING           |  |  |  |
| PHOTOGRAPHIC PROCESSING EQUIPMENT |  |  |  |
| PHOTOGRAPHIC RECORDING            |  |  |  |
| PHOTOGRAPHIC RECTIFIERS           |  |  |  |
| PHOTOGRAPHIC TRACKING             |  |  |  |
| PHOTOGRAPHS                       |  |  |  |
| PHOTOINTERPRETATION               |  |  |  |
| PHOTOLITHOGRAPHY                  |  |  |  |
| PHOTOMAPPING                      |  |  |  |
| PHOTOMAPS                         |  |  |  |
| PHOTOMASKS                        |  |  |  |
| PHOTOMECHANICAL EFFECT            |  |  |  |
| PHOTORECONNAISSANCE               |  |  |  |
| PINHOLE CAMERAS                   |  |  |  |
| PIXELS                            |  |  |  |
| PROJECTORS                        |  |  |  |
| RADIOGRAPHY                       |  |  |  |
| RAPID BALLISTICS IDENTIFICATION   |  |  |  |
| REPRODUCTION (COPYING)            |  |  |  |
| TIMBER INVENTORY                  |  |  |  |
| VIDEO TAPES                       |  |  |  |
| WAVE FRONT RECONSTRUCTION         |  |  |  |
| XEROGRAPHY                        |  |  |  |
| PHOTOINTERPRETATION               |  |  |  |
| 1401 3501                         |  |  |  |
| UF PHOTOGRAPH INTERPRETATION      |  |  |  |
| RT AERIAL PHOTOGRAPHY             |  |  |  |
| % ANALYZING                       |  |  |  |
| CHANGE DETECTION                  |  |  |  |
| GROUND TRUTH                      |  |  |  |
| % INTERPRETATION                  |  |  |  |
| PHOTOGRAPHIC MEASUREMENT          |  |  |  |
| PHOTOGRAPHY                       |  |  |  |
| PHOTOMAPPING                      |  |  |  |
| PHOTORECONNAISSANCE               |  |  |  |
| SEA TRUTH                         |  |  |  |
| SPATIAL FILTERING                 |  |  |  |
| PHOTOIONIZATION                   |  |  |  |
| 0605 2306 2401                    |  |  |  |
| GS EMISSION                       |  |  |  |
| #PHOTOIONIZATION                  |  |  |  |
| IONIZATION                        |  |  |  |
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| PHOTOELECTRICITY                  |  |  |  |
| .PHOTOELECTRIC EFFECT             |  |  |  |
| .#PHOTOIONIZATION                 |  |  |  |
| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
| PHOTOELECTRONS                    |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLITHOGRAPHY                  |  |  |  |
| 3404                              |  |  |  |
| GS PRINTING                       |  |  |  |
| .LITHOGRAPHY                      |  |  |  |
| .#PHOTOLITHOGRAPHY                |  |  |  |
| RT MICROELECTRONICS               |  |  |  |
| MICROMODULES                      |  |  |  |
| PHOTOGRAPHY                       |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
| 0605 2306 2402 3408               |  |  |  |
| GS EMISSION                       |  |  |  |
| .LIGHT EMISSION                   |  |  |  |
| ..LUMINESCENCE                    |  |  |  |
| ...#PHOTOLUMINESCENCE             |  |  |  |
| ....TRIBOLUMINESCENCE             |  |  |  |
| .....X RAY FLUORESCENCE           |  |  |  |
| FLUORESCENCE                      |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
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| PHOTOLUMINESCENT BANDS            |  |  |  |
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| GS SPECTRA                        |  |  |  |
| .SPECTRAL BANDS                   |  |  |  |
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| RT ABSORPTION SPECTRA             |  |  |  |
| % BANDS                           |  |  |  |
| EMISSION SPECTRA                  |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
| TRIBOLUMINESCENCE                 |  |  |  |
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| 0602 0605 2306                    |  |  |  |
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| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
| PHOTOELECTRONS                    |  |  |  |
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| 3404                              |  |  |  |
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| PHOTOLUMINESCENCE                 |  |  |  |
| 0605 2306 2402 3408               |  |  |  |
| GS EMISSION                       |  |  |  |
| .LIGHT EMISSION                   |  |  |  |
| ..LUMINESCENCE                    |  |  |  |
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| .....X RAY FLUORESCENCE           |  |  |  |
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| LASER INDUCED FLUORESCENCE        |  |  |  |
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| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
| PHOTOELECTRONS                    |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLITHOGRAPHY                  |  |  |  |
| 3404                              |  |  |  |
| GS PRINTING                       |  |  |  |
| .LITHOGRAPHY                      |  |  |  |
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| RT MICROELECTRONICS               |  |  |  |
| MICROMODULES                      |  |  |  |
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| PHOTOLUMINESCENCE                 |  |  |  |
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| GS EMISSION                       |  |  |  |
| .LIGHT EMISSION                   |  |  |  |
| ..LUMINESCENCE                    |  |  |  |
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| ....TRIBOLUMINESCENCE             |  |  |  |
| .....X RAY FLUORESCENCE           |  |  |  |
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| LASER INDUCED FLUORESCENCE        |  |  |  |
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| PHOTOLUMINESCENT BANDS            |  |  |  |
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| EMISSION SPECTRA                  |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
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| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
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| PHOTOEXCITATION                   |  |  |  |
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| 3404                              |  |  |  |
| GS PRINTING                       |  |  |  |
| .LITHOGRAPHY                      |  |  |  |
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| MICROMODULES                      |  |  |  |
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| PHOTOLUMINESCENCE                 |  |  |  |
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| GS EMISSION                       |  |  |  |
| .LIGHT EMISSION                   |  |  |  |
| ..LUMINESCENCE                    |  |  |  |
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| .....X RAY FLUORESCENCE           |  |  |  |
| FLUORESCENCE                      |  |  |  |
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| RT ABSORPTION SPECTRA             |  |  |  |
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| EMISSION SPECTRA                  |  |  |  |
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| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
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| .LIGHT EMISSION                   |  |  |  |
| ..LUMINESCENCE                    |  |  |  |
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| ....TRIBOLUMINESCENCE             |  |  |  |
| .....X RAY FLUORESCENCE           |  |  |  |
| FLUORESCENCE                      |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLUMINESCENT BANDS            |  |  |  |
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| .#PHOTOLUMINESCENT BANDS          |  |  |  |
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| % BANDS                           |  |  |  |
| EMISSION SPECTRA                  |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
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| PHOTOLYSIS                        |  |  |  |
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| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
| PHOTOELECTRONS                    |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLITHOGRAPHY                  |  |  |  |
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| MICROMODULES                      |  |  |  |
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| ..LUMINESCENCE                    |  |  |  |
| ...#PHOTOLUMINESCENCE             |  |  |  |
| ....TRIBOLUMINESCENCE             |  |  |  |
| .....X RAY FLUORESCENCE           |  |  |  |
| FLUORESCENCE                      |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLUMINESCENT BANDS            |  |  |  |
| PHOTOLUMINESCENT BANDS            |  |  |  |
| 0605 1411 2306                    |  |  |  |
| GS SPECTRA                        |  |  |  |
| .SPECTRAL BANDS                   |  |  |  |
| .#PHOTOLUMINESCENT BANDS          |  |  |  |
| RT ABSORPTION SPECTRA             |  |  |  |
| % BANDS                           |  |  |  |
| EMISSION SPECTRA                  |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
| TRIBOLUMINESCENCE                 |  |  |  |
| PHOTOLYSIS                        |  |  |  |
| 0602 0605 2306                    |  |  |  |
| PHOTOIONIZATION                   |  |  |  |
| 0605 2306 2401                    |  |  |  |
| GS EMISSION                       |  |  |  |
| #PHOTOIONIZATION                  |  |  |  |
| IONIZATION                        |  |  |  |
| #PHOTOIONIZATION                  |  |  |  |
| PHOTOELECTRICITY                  |  |  |  |
| .PHOTOELECTRIC EFFECT             |  |  |  |
| .#PHOTOIONIZATION                 |  |  |  |
| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
| ELECTRON EMISSION                 |  |  |  |
| GAS IONIZATION                    |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTODETACHMENT                   |  |  |  |
| PHOTOELECTRIC EMISSION            |  |  |  |
| PHOTOELECTRONS                    |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLITHOGRAPHY                  |  |  |  |
| 3404                              |  |  |  |
| GS PRINTING                       |  |  |  |
| .LITHOGRAPHY                      |  |  |  |
| .#PHOTOLITHOGRAPHY                |  |  |  |
| RT MICROELECTRONICS               |  |  |  |
| MICROMODULES                      |  |  |  |
| PHOTOGRAPHY                       |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
| 0605 2306 2402 3408               |  |  |  |
| GS EMISSION                       |  |  |  |
| .LIGHT EMISSION                   |  |  |  |
| ..LUMINESCENCE                    |  |  |  |
| ...#PHOTOLUMINESCENCE             |  |  |  |
| ....TRIBOLUMINESCENCE             |  |  |  |
| .....X RAY FLUORESCENCE           |  |  |  |
| FLUORESCENCE                      |  |  |  |
| LASER INDUCED FLUORESCENCE        |  |  |  |
| PHOTOEXCITATION                   |  |  |  |
| PHOTOLUMINESCENT BANDS            |  |  |  |
| PHOTOLUMINESCENT BANDS            |  |  |  |
| 0605 1411 2306                    |  |  |  |
| GS SPECTRA                        |  |  |  |
| .SPECTRAL BANDS                   |  |  |  |
| .#PHOTOLUMINESCENT BANDS          |  |  |  |
| RT ABSORPTION SPECTRA             |  |  |  |
| % BANDS                           |  |  |  |
| EMISSION SPECTRA                  |  |  |  |
| PHOTOLUMINESCENCE                 |  |  |  |
| TRIBOLUMINESCENCE                 |  |  |  |
| PHOTOLYSIS                        |  |  |  |
| 0602 0605 2306                    |  |  |  |
| PHOTOIONIZATION                   |  |  |  |
| 0605 2306 2401                    |  |  |  |
| GS EMISSION                       |  |  |  |
| #PHOTOIONIZATION                  |  |  |  |
| IONIZATION                        |  |  |  |
| #PHOTOIONIZATION                  |  |  |  |
| PHOTOELECTRICITY                  |  |  |  |
| .PHOTOELECTRIC EFFECT             |  |  |  |
| .#PHOTOIONIZATION                 |  |  |  |
| RT ATMOSPHERIC IONIZATION         |  |  |  |
| AURORAL IONIZATION                |  |  |  |
| AURORAL IRRADIATION               |  |  |  |
|                                   |  |  |  |

[illegible]

GAMMA RAY ABSORPTIOMETRY  
GAMMA RAY ABSORPTION  
MULTIPHOTON ABSORPTION  
RADIATION ABSORPTION

PHOTON BEAMS  
2306 2402 2403 2405  
GS BEAMS (RADIATION)  
#PHOTON BEAMS  
ELECTROMAGNETIC RADIATION  
#PHOTON BEAMS

RT  
BEAM WAVEGUIDES  
GAMMA RAY BEAMS  
INCIDENT RADIATION  
LASER OUTPUTS  
LIGHT BEAMS  
OPTICAL PATHS  
OPTICAL SCANNERS

PHOTON BEAMS  
PHOTOELECTROCHEMICAL DEVICES  
PHOTONIC PROPULSION  
PHOTONS  
REFLECTED WAVES  
REFRACTED WAVES  
THERMAL BLOOMING

```

PHOTON DENSITY
2306 2403 2405 3009
GS  RATES (PER TIME)
      . FLUX DENSITY
      . #PHOTON DENSITY
RT  SQUEEZED STATES

```

```

RT      SQUEEZED STATES (QUANTUM THEORY)
%
PHOTON-ELECTRON INTERACTION
0605 2202 2405
RT      ELASTIC SCATTERING
      ELECTRON SCATTERING
      ELEMENTARY PARTICLE INTERACTIONS
% INTERACTIONS
UMK1APP PROCESS

```

```

PHOTONEUTRONS
2202 2306 2405
GS   NUCLEAR RADIATION
      #PHOTONEUTRONS
PARTICLES
.ELEMENTARY PARTICLES
...FERMIONS
...NEUTRONS
...#PHOTONEUTRONS
.NEUTRAL PARTICLES
.NEUTRONS
..#PHOTONEUTRONS
      BARYONS
RT   NUCLEAR PARTICLES

```

NUCLEAR REACTIONS  
PHOTOELECTRONS  
PHOTONUCLEAR REACTIONS  
VECTOR DOMINANCE MODEL

PHOTONIC PROPULSION  
2202 2306 2308 2402 2405  
GS PROPULSION  
.LOW THRUST PROPULSION  
.PHOTONIC PROPULSION  
.SPACECRAFT PROPULSION  
.PHOTONIC PROPULSION  
RT ELECTROMAGNETIC PROPULSION  
PHOTON BEAMS

PHOTONIC SWITCHING  
USE OPTICAL SWITCHING

PHOTONICS  
2310 3405  
RT  
ELECTRO-OPTICS  
FIBER OPTICS  
LASERS  
LIGHT EMITTING DIODES  
OPTICAL DATA PROCESSING  
OPTICAL SWITCHING  
OPTICAL WAVEGUIDES  
OPTOELECTRONIC DEVICES  
PHOTONS

PHOTONS  
0710 2306 2310 2402 2403 2405 2903  
GS PARTICLES  
. ELEMENTARY PARTICLES  
.. BOSONS  
.. #PHOTONS  
..NUCLEAR PARTICLES  
.. BOSONS  
.. #PHOTONS  
RT ANNIHILATION REACTIONS  
COSMIC RAYS

COSMIC RAYS  
ELECTROMAGNETIC RADIATION  
GAMMA RAYS  
LIGHT (VISIBLE RADIATION)  
NUCLEAR RADIATION  
OPTICAL PROPERTIES  
PHOTON BEAMS  
PHOTONICS  
PHOTONUCLEAR REACTIONS  
PHOTO PRODUCTION  
PLANCKS CONSTANT  
QUANTUM THEORY  
RADIATION  
ROTONS

1060

PAIR PRODUCTION  
PHOTONS  
PHOTONUCLEAR REACTIONS  
RADIOACTIVE DECAY  
VECTOR DOMINANCE MODEL

PHOTORECEPTORS  
1413  
GS ANATOMY  
.SENSE ORGANS  
.#PHOTORECEPTORS  
RECEPTORS (PHYSIOLOGY)  
#PHOTORECEPTORS

PHOTOSENSORS  
USE PHOTOELECTRICITY  
RADIATION MEASURING INSTRUMENTS

PHOTOTHERMOTROPISM  
USE ANISOTROPY  
PHOTOTROPISM  
TEMPERATURE EFFECTS

THRESHOLDS (PERCEPTION)  
VISUAL PIGMENTS

THERMAL ENERGY  
THERMODYNAMICS

|    |                        |                    |                         |
|----|------------------------|--------------------|-------------------------|
| RT | PHOTORECEPTORS         | PHOTOSPHERE        | PHOTOTRANSISTORS        |
|    | EYE (ANATOMY)          | 1302 2903          | O905 O906 2306 2402     |
|    | PHOTOSENSITIVITY       | GS #PHOTOSPHERE    | GS ELECTRONIC EQUIPMENT |
|    | RETINA                 | .SOLAR GRANULATION | .SOLID STATE DEVICES    |
|    | SENSITOMETRY           | RT CHROMOSPHERE    | ..SEMICONDUCTOR DEVICES |
|    | VISUAL PIGMENTS        | FACULAE            | ...TRANSISTORS          |
|    | YOUNG-HELMHOLTZ THEORY | SOLAR ATMOSPHERE   |                         |

|                      |      |      |      |      |      |     |                        |
|----------------------|------|------|------|------|------|-----|------------------------|
| PHOTORECONNAISSANCE  | 1303 | 1401 | 1407 | 3401 | 3501 | ... | #PHOTOTRANSISTORS      |
| OS                   |      |      |      |      |      |     | OPTOELECTRONIC DEVICES |
| IMAGERY              |      |      |      |      |      |     | #PHOTOTRANSISTORS      |
| #PHOTORECONNAISSANCE |      |      |      |      |      |     | JUNCTION TRANSISTORS   |
| RECONNAISSANCE       |      |      |      |      |      |     | PHOTOCONDUCTORS        |
| #PHOTORECONNAISSANCE |      |      |      |      |      |     | PHOTODIODES            |
| ACQUISITION          |      |      |      |      |      |     | PHOTOELECTRIC CELLS    |
| RT                   |      |      |      |      |      |     |                        |

|    |                                    |                     |                         |
|----|------------------------------------|---------------------|-------------------------|
| RI | AERIAL RECONNAISSANCE              | PHOTOSTRESSES       | PHOTOELECTRIC MATERIALS |
|    | AIRBORNE INTEGRATED RECONNAISSANCE | 2306 2405           | PHOTOMETERS             |
|    | SYSTEM                             | GS                  | PHOTOTUBES              |
|    | BLACK AND WHITE PHOTOGRAPHY        | #PHOTOSTRESSES      |                         |
|    | DMSP SATELLITES                    |                     |                         |
|    | EARTH RESOURCES SURVEY AIRCRAFT    | PHOTOSYNTHESIS      | PHOTOTROPISM            |
|    | GROUND TRUTH                       | 0404 0409 0507 2306 | 0404 0409 2306          |
|    |                                    |                     | UF                      |
|    |                                    |                     | PHOTOTHERMOTROPISM      |

|                          |    |                          |    |                    |
|--------------------------|----|--------------------------|----|--------------------|
| HS-801 AIRCRAFT          | GS | CHEMICAL REACTIONS       | GS | PHOTOSENSITIVITY   |
| PHOTOGRAMMETRY           |    | .PHOTOCHEMICAL REACTIONS |    | .PHOTOSENSITIVITY  |
| PHOTOGRAPHIC MEASUREMENT |    | .#PHOTOSYNTHESIS         |    | .#PHOTOTROPISM     |
| PHOTOGRAPHY              | RT | ALGAE                    | RT | COLOR              |
| PHOTOINTERPRETATION      |    | CARBOHYDRATES            |    | CROP VIGOR         |
| SPECTRAL RECONNAISSANCE  |    | CHLORELLA                |    | OPTICAL PROPERTIES |
|                          |    | CHLOROPHYLLS             |    | PLANTS (BOTANY)    |

PHOTOREDUCTION  
USE PHOTOCHEMICAL REACTIONS  
CHLOROPLASTS  
CROP GROWTH  
RESPIRATION  
PHOTORESISTIVITY  
USE PHOTOCONDUCTIVITY  
PHOTORESISTORS  
PHOTOTHERMAL CONVERSION  
1802  
GS ENERGY CONVERSION  
PHOTOTUBES  
0905 2306  
GS ELECTRON TUBES  
. COLD CATHODE TUBES  
. #PHOTOTUBES  
PHOTOMULTIPLIER TUBES

|                          |                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USE                      | PHOTOCONDUCTORS                                                                                                                                                    |
| PHOTOSENSITIVITY         |                                                                                                                                                                    |
| O605                     | 0902 1413 2304 2306                                                                                                                                                |
| GS                       | SENSITIVITY                                                                                                                                                        |
| #PHOTOSENSITIVITY        |                                                                                                                                                                    |
| ..LIGHT ADAPTATION       |                                                                                                                                                                    |
| RT %                     | .SOLAR ENERGY CONVERSION<br>.#PHOTOTHERMAL CONVERSION<br>CONVERSION<br>ENERGY ABSORPTION FILMS<br>ENERGY CONVERSION EFFICIENCY<br>ENERGY TECHNOLOGY<br>SELECTIVITY |
| CATHODES                 |                                                                                                                                                                    |
| ELECTRODES               |                                                                                                                                                                    |
| FLYING SPOT SCANNERS     |                                                                                                                                                                    |
| GAS DISCHARGE TUBES      |                                                                                                                                                                    |
| MICROWAVE TUBES          |                                                                                                                                                                    |
| PHOTOMULTIPLIERS         |                                                                                                                                                                    |
| ...PHOTOMULTIPLIER TUBES |                                                                                                                                                                    |
| ....FREQUENCY MODULATION |                                                                                                                                                                    |

..PHOTOTROPISM  
SOLAR COLLECTORS  
MICROWAVE TUBES  
PHOTODIODES

```

SOLAR DYNAMIC POWER SYSTEMS
SOLAR ENERGY ABSORBERS
SOLAR REFLECTORS
SOLAR THERMAL ELECTRIC POWER
SPECTRAL SENSITIVITY
THERMAL ENERGY
THERMODYNAMICS

PHOTOTHERMOTROPISM
USE ANISOTROPY
PHOTOTROPISM
TEMPERATURE EFFECTS

PHOTOTRANSISTORS
O905 O906 2306 2402
GS ELECTRONIC EQUIPMENT
.SOLID STATE DEVICES
..SEMICONDUCTOR DEVICES
...TRANSISTORS
...#PHOTOTRANSISTORS
OPTOELECTRONIC DEVICES
#PHOTOTRANSISTORS
RT JUNCTION TRANSISTORS
PHOTOCONDUCTORS
PHOTODIODES
PHOTOELECTRIC CELLS
PHOTOELECTRIC MATERIALS
PHOTOMETERS
PHOTOTUBES

PHOTOTROPISM
O404 O409 2306
UF PHOTOTHERMOTROPISM
GS SENSITIVITY
.PHOTOSENSITIVITY
.#PHOTOTROPISM
RT COLOR
CROP VIGOR
OPTICAL PROPERTIES
PLANTS (BOTANY)

PHOTOTUBES
O905 2306
GS ELECTRON TUBES
.COLD CATHODE TUBES
.#PHOTOTUBES
...PHOTOMULTIPLIER TUBES
...FREQUENCY MODULATION
PHOTOMULTIPLIERS
RT CATHODES
ELECTRODES
FLYING SPOT SCANNERS
GAS DISCHARGE TUBES
MICROWAVE TUBES
PHOTODIODES

```

PHOTOELECTRIC CELLS  
 PHOTOELECTRIC MATERIALS  
 PHOTOTRANSISTORS  
 PHOTOVISCOELASTICITY  
 2306 2311 2601  
 GS ELECTROMAGNETIC PROPERTIES  
 .OPTICAL PROPERTIES  
 .#PHOTOVISCOELASTICITY  
 .PHOTOELASTICITY  
 .#PHOTOVISCOELASTICITY  
 MECHANICAL PROPERTIES  
 .ELASTIC PROPERTIES  
 ..#PHOTOELASTICITY  
 ..#PHOTOVISCOELASTICITY  
 ..VISCOELASTICITY  
 ..#PHOTOVISCOELASTICITY

## PHOTOVOLTAGES

0902 2304 2306  
 GS POTENTIAL ENERGY  
 .ELECTRIC POTENTIAL  
 .#PHOTOVOLTAGES  
 RT PHOTOELECTRIC EMISSION  
 PHOTOELECTRICITY  
 PHOTOVOLTAIC EFFECT  
 THRESHOLD VOLTAGE

## PHOTOVOLTAIC CELLS

0301 1413 2304 2306  
 GS ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 ..PHOTOELECTRIC GENERATORS  
 ..#PHOTOVOLTAIC CELLS  
 ....SOLAR CELLS  
 ....VERTICAL JUNCTION SOLAR CELLS  
 ELECTRONIC EQUIPMENT  
 .SOLID STATE DEVICES  
 ..SEMICONDUCTOR DEVICES  
 ..#PHOTOVOLTAIC CELLS  
 ....SOLAR CELLS  
 ....VERTICAL JUNCTION SOLAR CELLS  
 PHOTOELECTRIC CELLS  
 #PHOTOVOLTAIC CELLS  
 ..SOLAR CELLS  
 ...VERTICAL JUNCTION SOLAR CELLS  
 RT AMORPHOUS SILICON  
 % CELLS  
 ELECTROCHEMICAL CELLS  
 PHOTOCONDUCTIVE CELLS  
 PHOTOELECTRIC MATERIALS  
 SHORT CIRCUIT CURRENTS  
 SIS (SEMICONDUCTORS)  
 SOLAR GENERATORS

PHOTOVOLTAIC CONVERSION  
 0301 0302 1802  
 GS ENERGY CONVERSION  
 .SOLAR ENERGY CONVERSION  
 .#PHOTOVOLTAIC CONVERSION  
 RT % CONVERSION  
 PHOTOVOLTAIC EFFECT  
 SOLAR ARRAYS  
 SOLAR CELLS

## PHOTOVOLTAIC EFFECT

0301 0604 2304  
 GS ELECTRICAL PROPERTIES  
 #PHOTOVOLTAIC EFFECT  
 PHOTOELECTRICITY  
 .PHOTOELECTRIC EFFECT  
 .#PHOTOVOLTAIC EFFECT  
 RT % EFFECTS  
 PHOTOELECTRIC EMISSION  
 PHOTOELECTRONS  
 PHOTOVOLTAGES  
 PHOTOVOLTAIC CONVERSION  
 THRESHOLD VOLTAGE

## PHREATOPHYTES

0409  
 GS PLANTS (BOTANY)  
 #PHREATOPHYTES  
 RT TREES (PLANTS)

## PHTHALATES

0603 1808  
 GS ESTERS  
 #PHTHALATES

## PHTHALOCYANIN

0603 1808  
 GS ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ..#PHTHALOCYANIN  
 RT PIGMENTS

## PHUGOID OSCILLATIONS

USE OSCILLATIONS  
 PITCH (INCLINATION)

## PHYLLUQUINONE

0403 0405 1808  
 UF VITAMIN K  
 GS ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ..#PHYLLUQUINONE  
 .LIPIDS

.#PHYLLUQUINONE  
 VITAMINS  
 #PHYLLUQUINONE

## PHYSICAL CHEMISTRY

0602 2401 2404 2405  
 GS #PHYSICAL CHEMISTRY  
 .CRYOCHEMISTRY  
 .QUANTUM CHEMISTRY  
 RT AEROTHERMOCHEMISTRY  
 ATMOSPHERIC CHEMISTRY  
 CHEMICAL ANALYSIS  
 % CHEMISTRY  
 COMPUTATIONAL CHEMISTRY  
 MOLECULAR DYNAMICS  
 NUCLEAR CHEMISTRY  
 % PHYSICS  
 THERMOCHEMISTRY  
 THERMODYNAMICS

## PHYSICAL CONSTANTS TESTING REACTOR

USE NUCLEAR RESEARCH AND TEST REACTORS  
 WATER COOLED REACTORS

## PHYSICAL ENDURANCE

USE PHYSICAL FITNESS

## PHYSICAL EXAMINATIONS

0401 0405 0408  
 RT FLIGHT FITNESS  
 MOBILE QUARANTINE FACILITY  
 PERCUSSION  
 PERSONNEL SELECTION

## PHYSICAL EXERCISE

0401 0405 0408  
 UF EXERCISE  
 GYMNASTICS  
 GS #PHYSICAL EXERCISE  
 .HYPERKINESIA  
 RT ANGINA PECTORIS  
 ATHLETES  
 ATROPHY  
 FATIGUE (BIOLOGY)  
 HYPOKINESIA  
 PHYSICAL FITNESS  
 RUNNING  
 SWIMMING  
 TREADMILLS  
 WALKING

## PHYSICAL FACTORS

0408 2311  
 GS PHYSIOLOGICAL FACTORS  
 #PHYSICAL FACTORS



# NASA THESAURUS HIERARCHICAL UPDATE

RT % PHYSICS  
WORK

PHYSICAL FITNESS  
O401 O404 O405 O408  
UF PHYSICAL ENDURANCE  
GS FITNESS  
#PHYSICAL FITNESS  
RT ATHLETES  
COMPETITION  
EXERCISE PHYSIOLOGY  
FLIGHT FITNESS  
PHYSICAL EXERCISE  
PHYSIOLOGICAL TESTS  
POSTURE  
SPORTS MEDICINE  
SWIMMING  
TREADMILLS  
WORK CAPACITY

PHYSICAL OPTICS

2306 2310  
RT CRYSTAL OPTICS  
FIBER OPTICS  
GEOMETRICAL OPTICS  
GRADIENT INDEX OPTICS  
OPTICAL PROPERTIES  
% OPTICS  
QUANTUM OPTICS  
QUANTUM THEORY  
% THEORIES

% PHYSICAL PROPERTIES

2311 3408  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT ACOUSTIC PROPERTIES  
ADSORPTIVITY  
BRAGG ANGLE  
BUOYANCY  
CHEMICAL PROPERTIES  
COLOR  
DENSITY (MASS/VOLUME)  
DIFFUSIVITY  
DURABILITY  
EDDY CURRENTS  
ELASTIC PROPERTIES  
ELECTRICAL PROPERTIES  
ELECTROMAGNETIC PROPERTIES  
FUSIBILITY  
% HIGH RESISTANCE  
HYGROSCOPICITY  
HYSTERESIS  
IMPEDANCE

INTERNAL FRICTION  
ISOTROPY  
MAGNETIC DIPOLES  
MAGNETIC PROPERTIES  
MECHANICAL PROPERTIES  
OPTICAL PROPERTIES  
PERMEABILITY  
POLYMORPHISM  
PROPELLANT PROPERTIES  
% PROPERTIES  
SURFACE PROPERTIES  
THERMAL EXPANSION  
THERMODYNAMIC PROPERTIES  
THIXOTROPY  
TRANSMISSIVITY  
TRANSPORT PROPERTIES  
VIRTUAL PROPERTIES  
VISCOSITY

% PHYSICAL SCIENCES

O404 3409  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT ASTRONOMY  
% CHEMISTRY  
GEOLOGY  
LIFE SCIENCES  
% METALLURGY  
METEOROLOGY  
MINERALOGY  
OCEANOGRAPHY  
% PHYSICS  
% SCIENCE

PHYSICAL WORK

O404 O502 O506  
UF EXERTION  
GS WORK  
#PHYSICAL WORK  
RT EFFORT  
HORSEPOWER  
TASKS  
TREADMILLS  
WORK CAPACITY  
WORKLOADS (PSYCHOPHYSIOLOGY)

PHYSICIANS

O401 O405 O408  
GS PERSONNEL  
.MEDICAL PERSONNEL  
.#PHYSICIANS  
RT STETHOSCOPES  
% PHYSICS

2311

SN

(USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT ASTROPHYSICS  
ATMOSPHERIC PHYSICS  
ATOMIC PHYSICS  
BIOPHYSICS  
BRANCHING (PHYSICS)  
CHARM (PARTICLE PHYSICS)  
CLOUD PHYSICS  
COMBUSTION  
COMBUSTION PHYSICS  
CONDENSED MATTER PHYSICS  
DEGENERATE MATTER  
ELECTROPHYSICS  
FIELD THEORY (PHYSICS)  
GEOPHYSICS  
HEALTH PHYSICS  
HEALTH PHYSICS RESEARCH REACTOR  
KINETICS  
LOW TEMPERATURE PHYSICS  
MAGNETOMECHANICS (PHYSICS)  
MATTER (PHYSICS)  
% MECHANICS (PHYSICS)  
% MOLECULAR PHYSICS  
NEUTRON PHYSICS  
NUCLEAR PHYSICS  
NUCLEI (NUCLEAR PHYSICS)  
PHYSICAL CHEMISTRY  
PHYSICAL FACTORS  
PHYSICAL SCIENCES  
PLASMA PHYSICS  
PLASMAS (PHYSICS)  
POLYMER PHYSICS  
PSYCHOPHYSICS  
QUENCHING (ATOMIC PHYSICS)  
RADIO PHYSICS  
REACTOR PHYSICS  
REENTRY PHYSICS  
RIGID ROTORS (PLASMA PHYSICS)  
% SCIENCE  
SELECTION RULES (NUCLEAR PHYSICS)  
SOLAR PHYSICS  
% SOLID STATE PHYSICS  
STRANGE ATTRACTORS  
THEORETICAL PHYSICS

PHYSICS AND CHEMISTRY EXPERIMENT IN SPACE  
O709  
UF PACE  
GS EXPERIMENTATION  
#PHYSICS AND CHEMISTRY EXPERIMENT  
IN SPACE  
PAYLOADS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| .SPACE SHUTTLE PAYLOADS<br>.#PHYSICS AND CHEMISTRY EXPERIMENT<br>IN SPACE<br>SPACEBORNE EXPERIMENTS<br>#PHYSICS AND CHEMISTRY EXPERIMENT<br>IN SPACE<br>RT % CHEMISTRY<br>SPACE FLIGHT<br><br>PHYSCHEMISTRY<br>O403 O404 O408 1808<br>GS BIOCHEMISTRY<br>#PHYSCHEMISTRY<br>RT % CHEMISTRY<br>EXERCISE PHYSIOLOGY<br>MOLECULAR BIOLOGY<br>ORGANIC CHEMISTRY<br>PHYSIOLOGY<br>PSYCHOTROPIC DRUGS<br>% SCIENCE                                                                                                                                                                                                                                                                                                                         | COMFORT<br>DIVING (UNDERWATER)<br>% EFFECTS<br>ELECTROLYTE METABOLISM<br>ENVIRONMENTAL ENGINEERING<br>ENVIRONMENTS<br>EXERCISE PHYSIOLOGY<br>GEOTROPISM<br>GONADS<br>GRAVITATIONAL PHYSIOLOGY<br>HEAD DOWN TILT<br>HEAT ACCLIMATIZATION<br>HEAT STROKE<br>HEMATOPOIESIS<br>HEMATOPOIETIC SYSTEM<br>HUMAN REACTIONS<br>NOISE POLLUTION<br>RADIATION EFFECTS<br>REACTION TIME<br>RELATIVE BIOLOGICAL EFFECTIVENESS<br>(RBE)<br>SHOCK (PHYSIOLOGY)<br>SPACE ADAPTATION SYNDROME<br>SPORTS MEDICINE                                                                                                                                                                                | .BODY SWAY TEST<br>.CARBOXYHEMOGLOBIN TEST<br>.EAR PRESSURE TEST<br>.ELECTRONYSTAGMOGRAPHY<br>.VESTIBULAR TESTS<br>.WEBER TEST<br>CARDIAC OUTPUT<br>CARDIOGRAPHY<br>CERTIFICATION<br>ENVIRONMENTAL INDEX<br>ENVIRONMENTAL TESTS<br>MOBILE QUARANTINE FACILITY<br>PERSONNEL SELECTION<br>PHYSICAL FITNESS<br>PILOT SELECTION<br>PSYCHOMOTOR PERFORMANCE<br>SENSORIMOTOR PERFORMANCE<br>STROKE VOLUME<br>TAYLOR MANIFEST ANXIETY SCALE<br>% TESTS<br>TREADMILLS<br>URINALYSIS                                                                                                                                            |
| PHYSIOGRAPHY<br>USE GEOMORPHOLOGY<br><br>PHYSIOLOGICAL ACCELERATION<br>O401 O405 O408<br>GS RATES (PER TIME)<br>#PHYSIOLOGICAL ACCELERATION<br>RT % ACCELERATION<br>ACCELERATION (PHYSICS)<br>ACCELERATION STRESSES (PHYSIOLOGY)<br>DECELERATION<br>GRAVITATIONAL PHYSIOLOGY<br>IMPACT ACCELERATION<br><br>PHYSIOLOGICAL DEFENSES<br>O404 O405 O408 O412<br>GS #PHYSIOLOGICAL DEFENSES<br>.IMMUNE SYSTEMS<br>RT ACQUIRED IMMUNODEFICIENCY SYNDROME<br>ANTIBODIES<br>ANTIGENS<br>BIOCOMPATIBILITY<br>% DEFENSE<br>INOCULUM<br>INTERFERON<br><br>PHYSIOLOGICAL EFFECTS<br>O401 O403 O405<br>GS #PHYSIOLOGICAL EFFECTS<br>.PHYSIOLOGICAL RESPONSES<br>.HEMODYNAMIC RESPONSES<br>BIOLOGICAL EFFECTS<br>BONE DEMINERALIZATION<br>CHOLERA | PHYSIOLOGICAL FACTORS<br>O401 O405 O408<br>GS #PHYSIOLOGICAL FACTORS<br>.PHYSICAL FACTORS<br>RT ASTRONAUT PERFORMANCE<br>CHEMICAL DEFENSE<br>CHEMICAL WARFARE<br>FLIGHT STRESS (BIOLOGY)<br>NOISE POLLUTION<br>SEX FACTOR<br><br>PHYSIOLOGICAL RESPONSES<br>O408<br>GS PHYSIOLOGICAL EFFECTS<br>#PHYSIOLOGICAL RESPONSES<br>..HEMODYNAMIC RESPONSES<br>RESPONSES<br>#PHYSIOLOGICAL RESPONSES<br>..HEMODYNAMIC RESPONSES<br>RT DESYNCHRONIZATION (BIOLOGY)<br>EVOKED RESPONSE (PSYCHOPHYSIOLOGY)<br>GRAVITATIONAL PHYSIOLOGY<br>PATHOLOGICAL EFFECTS<br><br>PHYSIOLOGICAL TELEMETRY<br>USE BIOTELEMETRY<br><br>PHYSIOLOGICAL TESTS<br>O401 O405 O408<br>GS #PHYSIOLOGICAL TESTS | PHYSIOLOGY<br>O408<br>GS #PHYSIOLOGY<br>.ELECTROPHYSIOLOGY<br>.EXERCISE PHYSIOLOGY<br>.GRAVITATIONAL PHYSIOLOGY<br>.NEUROPHYSIOLOGY<br>.PSYCHOPHYSIOLOGY<br>.RESPIRATORY PHYSIOLOGY<br>.UNDERWATER PHYSIOLOGY<br>AGING (BIOLOGY)<br>BLOOD CIRCULATION<br>BONE DEMINERALIZATION<br>CATABOLISM<br>CYTOGENESIS<br>DIFFERENTIATION (BIOLOGY)<br>DIGESTING<br>HEART FUNCTION<br>HEMODYNAMICS<br>HOMEOSTASIS<br>MENSTRUATION<br>METABOLISM<br>MITOSIS<br>NARCOSIS<br>PHYSIOCHEMISTRY<br>REGENERATION (PHYSIOLOGY)<br>REGULARITY<br>RESPIRATION<br>% SCIENCE<br>SHOCK (PHYSIOLOGY)<br>STRESS (PHYSIOLOGY)<br>THERMOREGULATION |

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

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    .#PIEZOELECTRIC GAGES
    PRESSURE SENSORS
    STRAIN GAGES

    RT
    1002 2304 2601
    GS
    PIEZOELECTRIC TRANSDUCERS
    1002 2304 2601
    GS
    #PIEZOELECTRIC TRANSDUCERS
    ..PIEZOELECTRIC GAGES
    RT INTERDIGITAL TRANSDUCERS
    PRAETERSONIC DEVICES
    ULTRASONIC CLEANING

    PIEZOELECTRICITY
    1002 2304 2404 2601
    GS ELECTRICAL PROPERTIES
    #PIEZOELECTRICITY
    MECHANICAL PROPERTIES
    #PIEZOELECTRICITY
    RT CRYSTAL OSCILLATORS
    ELASTIC PROPERTIES
    ELECTRICITY
    ELECTROSTRICTION
    PIEZORESISTIVE TRANSDUCERS
    PYROELECTRICITY

    PIEZOMETERS
    0905 1408 2601 3501
    GS MEASURING INSTRUMENTS
    .PRESSURE GAGES
    .#PIEZOMETERS
    RT SEEPAGE

    PIEZORESISTIVE TRANSDUCERS
    0905 1002 1406 1408 3501
    GS TRANSDUCERS
    #PIEZORESISTIVE TRANSDUCERS
    ..PIEZOELECTRIC GAGES
    RT PIEZOELECTRIC CRYSTALS
    PIEZOELECTRICITY

    PIGEONS
    0402
    GS ANIMALS
    .VERTEBRATES
    ..BIRDS
    ...#PIGEONS

    PIGGYBACK SYSTEMS
    2806 3106 3107 3110 3409
    RT AIR LAUNCHING
    MULTISTAGE ROCKET VEHICLES
    PAYLOAD MASS RATIO
    PAYLOADS
    % SYSTEMS

    PIGMENTS
    1802 1805
    GS #PIGMENTS
    .CAROTENE
    .CHLOROPHYLLS
    .CYTOCHROMES
    .MELANIN
    .VISUAL PIGMENTS
    RT ADDITIVES
    ALBINISM
    ANATASE
    DOPA
    FILLERS
    INKS
    MYOGLOBIN
    PAINTS
    PHTHALOCYANIN
    RUTILE
    SKIN (ANATOMY)

    PIGS (SWINE)
    USE SWINE

    PIKE'S PEAK (CO)
    1305
    GS LANDFORMS
    .PEAKS (LANDFORMS)
    .#PIKE'S PEAK (CO)
    RT COLORADO
    MOUNTAINS

    PILE FOUNDATIONS
    3202
    GS FOUNDATIONS
    #PILE FOUNDATIONS
    RT % PILES

    % PILES
    2202 2203 2204 2405
    SN (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS
    LISTED BELOW)
    RT NUCLEAR REACTORS
    PILE FOUNDATIONS

    PILLOWS
    0506 0508 1811 3203
    RT COUCHES
    CUSHIONS
    SEATS

    PILOCARPINE
    0403 0405 0409
    GS BASES (CHEMICAL)

    PILOT ERROR
    0203 0502 2103 2104
    UF FLIGHT TECHNICAL ERROR
    GS ERRORS
    #PILOT ERROR
    RT AIRCRAFT ACCIDENTS
    COLLISIONS
    CRASH LANDING
    CRASHES
    HUMAN FACTORS ENGINEERING
    HUMAN PERFORMANCE
    MIDAIR COLLISIONS
    PILOT INDUCED OSCILLATION

    PILOT INDUCED OSCILLATION
    0201 0202
    RT AERODYNAMIC STABILITY
    AIRCRAFT CONTROL
    AIRCRAFT STABILITY
    CONTROL STABILITY
    HIGH GAIN
    LONGITUDINAL CONTROL
    MAN MACHINE SYSTEMS
    NONSTABILIZED OSCILLATION
    PILOT ERROR
    PILOT PERFORMANCE
    SELF INDUCED VIBRATION
    STABLE OSCILLATIONS
    TRANSIENT OSCILLATIONS

    PILOT LANDING AID TELEVISION SYSTEM
    USE PLAT SYSTEM

    PILOT PERFORMANCE
    0502 0506
    GS HUMAN PERFORMANCE
    #PILOT PERFORMANCE
    RT AIRCRAFT PERFORMANCE
    ASTRONAUT PERFORMANCE
    FLIGHT FATIGUE
    INTRAHEMICULAR ACTIVITY
    MAN OPERATED PROPULSION SYSTEMS
    OPERATOR PERFORMANCE
    % PERFORMANCE

    PIGS (SWINE)
    USE SWINE

    PIKE'S PEAK (CO)
    1305
    GS LANDFORMS
    .PEAKS (LANDFORMS)
    .#PIKE'S PEAK (CO)
    RT COLORADO
    MOUNTAINS

    PILE FOUNDATIONS
    3202
    GS FOUNDATIONS
    #PILE FOUNDATIONS
    RT % PILES

    % PILES
    2202 2203 2204 2405
    SN (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS
    LISTED BELOW)
    RT NUCLEAR REACTORS
    PILE FOUNDATIONS

    PILLOWS
    0506 0508 1811 3203
    RT COUCHES
    CUSHIONS
    SEATS

    PILOCARPINE
    0403 0405 0409
    GS BASES (CHEMICAL)

    PILOT ERROR
    0203 0502 2103 2104
    UF FLIGHT TECHNICAL ERROR
    GS ERRORS
    #PILOT ERROR
    RT AIRCRAFT ACCIDENTS
    COLLISIONS
    CRASH LANDING
    CRASHES
    HUMAN FACTORS ENGINEERING
    HUMAN PERFORMANCE
    MIDAIR COLLISIONS
    PILOT INDUCED OSCILLATION

    PILOT INDUCED OSCILLATION
    0201 0202
    RT AERODYNAMIC STABILITY
    AIRCRAFT CONTROL
    AIRCRAFT STABILITY
    CONTROL STABILITY
    HIGH GAIN
    LONGITUDINAL CONTROL
    MAN MACHINE SYSTEMS
    NONSTABILIZED OSCILLATION
    PILOT ERROR
    PILOT PERFORMANCE
    SELF INDUCED VIBRATION
    STABLE OSCILLATIONS
    TRANSIENT OSCILLATIONS

    PILOT LANDING AID TELEVISION SYSTEM
    USE PLAT SYSTEM

    PILOT PERFORMANCE
    0502 0506
    GS HUMAN PERFORMANCE
    #PILOT PERFORMANCE
    RT AIRCRAFT PERFORMANCE
    ASTRONAUT PERFORMANCE
    FLIGHT FATIGUE
    INTRAHEMICULAR ACTIVITY
    MAN OPERATED PROPULSION SYSTEMS
    OPERATOR PERFORMANCE
    % PERFORMANCE

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HOLDERS  
LATCHES  
RIVETS  
% SPIKES  
STUDS (STRUCTURAL MEMBERS)

PINTLES  
0202 1504 3203  
RT PIVOTS  
RUDDERS

SHAFTS (MACHINE ELEMENTS)

PION BEAMS  
1002 2401 2402 2403 2405  
GS BEAMS (RADIATION)  
. PARTICLE BEAMS  
. #PION BEAMS  
NEUTRAL BEAMS  
NEUTRON BEAMS

PIONEER F SPACE PROBE  
USE PIONEER 10 SPACE PROBE

PIONEER G SPACE PROBE  
USE PIONEER 11 SPACE PROBE

PIONEER PROJECT  
3007 3107 3108  
GS PROGRAMS  
. NASA PROGRAMS  
. . NASA SPACE PROGRAMS  
. . #PIONEER PROJECT  
. PROJECTS  
. #PIONEER PROJECT  
. SPACE PROGRAMS  
. . NASA SPACE PROGRAMS  
. . #PIONEER PROJECT  
LUNAR PROBES  
PIONEER SPACE PROBES  
SPACE PROBES

PIONEER SATURN SPACECRAFT  
USE PIONEER 11 SPACE PROBE

PIONEER SPACE PROBES  
3007 3107 3108  
GS INTERPLANETARY SPACECRAFT  
#PIONEER SPACE PROBES  
. PIONEER VENUS 2 ENTRY PROBES  
. . PIONEER VENUS 2 NIGHT PROBE  
. . . PIONEER VENUS 2 SOUNDER PROBE  
. PIONEER 1 SPACE PROBE  
. . PIONEER 2 SPACE PROBE  
. . PIONEER 3 SPACE PROBE  
. . PIONEER 4 SPACE PROBE

. . PIONEER 5 SPACE PROBE  
. . PIONEER 6 SPACE PROBE  
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. . PIONEER 8 SPACE PROBE  
. . PIONEER 9 SPACE PROBE  
. . PIONEER 10 SPACE PROBE  
. . PIONEER 11 SPACE PROBE  
UNMANNED SPACECRAFT  
. SPACE PROBES  
. #PIONEER SPACE PROBES  
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. . . PIONEER VENUS 2 NIGHT PROBE  
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UNMANNED SPACECRAFT  
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. . . . . PIONEER 10 SPACE PROBE  
. . . . . PIONEER 11 SPACE PROBE  
JUNO 2 LAUNCH VEHICLE  
PIONEER PROJECT  
PIONEER VENUS SPACECRAFT  
PIONEER VENUS 1 SPACECRAFT  
PIONEER VENUS 2 SPACECRAFT  
SOLAR PROBES

RT  
PIONEER VENUS ORBITER  
USE PIONEER VENUS 1 SPACECRAFT  
PIONEER VENUS SPACECRAFT  
3108 3007  
UF PIONEER 12 SPACE PROBE  
GS INTERPLANETARY SPACECRAFT  
#PIONEER VENUS SPACECRAFT  
. PIONEER VENUS 1 SPACECRAFT  
. . PIONEER VENUS 2 SPACECRAFT  
. . . PIONEER VENUS 2 TRANSPORTER BUS  
UNMANNED SPACECRAFT  
#PIONEER VENUS SPACECRAFT  
. PIONEER VENUS 1 SPACECRAFT  
. . PIONEER VENUS 2 SPACECRAFT  
. . . PIONEER VENUS 2 TRANSPORTER BUS  
PIONEER SPACE PROBES  
% PROBES  
SPACE PROBES

PIONEER VENUS ORBITER  
USE PIONEER VENUS 1 SPACECRAFT

PIONEER VENUS SPACECRAFT  
3108 3007  
UF PIONEER 12 SPACE PROBE  
GS INTERPLANETARY SPACECRAFT  
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PIONEER SPACE PROBES  
% PROBES  
SPACE PROBES

PIONEER VENUS SPACECRAFT  
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UNMANNED SPACECRAFT  
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. . . PIONEER VENUS 2 TRANSPORTER BUS  
PIONEER SPACE PROBES  
% PROBES  
SPACE PROBES

PIONEER VENUS 1 SPACECRAFT  
3007 3107  
UF PIONEER VENUS ORBITER  
GS INTERPLANETARY SPACECRAFT

. PIONEER VENUS SPACECRAFT  
. #PIONEER VENUS 1 SPACECRAFT  
UNMANNED SPACECRAFT  
. PIONEER VENUS SPACECRAFT  
. #PIONEER VENUS 1 SPACECRAFT  
. . PIONEER SPACE PROBES  
% PROBES  
SPACE PROBES

PIONEER VENUS 2 ENTRY PROBES  
3107  
GS INTERPLANETARY SPACECRAFT  
. PIONEER SPACE PROBES  
. #PIONEER VENUS 2 ENTRY PROBES  
. . PIONEER VENUS 2 NIGHT PROBE  
. . . PIONEER VENUS 2 SOUNDER PROBE  
UNMANNED SPACECRAFT  
. SPACE PROBES  
. . PIONEER SPACE PROBES  
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SPACE PROBES  
PIONEER VENUS 2 ENTRY PROBES  
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. . . . . PIONEER VENUS 2 SOUNDER PROBE  
RT  
PIONEER VENUS 2 SOUNDER PROBE  
% PROBES  
SPACE PROBES

PIONEER VENUS 2 MULTIPROBE SPACECRAFT  
USE PIONEER VENUS 2 SPACECRAFT

PIONEER VENUS 2 NIGHT PROBE  
3107 3009  
GS INTERPLANETARY SPACECRAFT  
. PIONEER SPACE PROBES  
. . PIONEER VENUS 2 ENTRY PROBES  
. . . PIONEER VENUS 2 NIGHT PROBE  
UNMANNED SPACECRAFT  
. SPACE PROBES  
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RT  
PIONEER VENUS 2 SOUNDER PROBE  
% PROBES  
SPACE PROBES  
PIONEER VENUS 2 SOUNDER PROBE  
3107 3009  
GS INTERPLANETARY SPACECRAFT  
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. . PIONEER VENUS 2 ENTRY PROBES  
. . . PIONEER VENUS 2 SOUNDER PROBE  
UNMANNED SPACECRAFT  
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. . . . PIONEER VENUS 2 NIGHT PROBE  
. . . . . PIONEER VENUS 2 SOUNDER PROBE

PIONEER VENUS 2 SOUNDER PROBE  
3107 3009  
GS INTERPLANETARY SPACECRAFT  
. PIONEER SPACE PROBES  
. . PIONEER VENUS 2 ENTRY PROBES  
. . . PIONEER VENUS 2 SOUNDER PROBE  
UNMANNED SPACECRAFT  
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. . PIONEER SPACE PROBES  
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RT  
PIONEER VENUS 2 SOUNDER PROBE  
% PROBES  
SPACE PROBES  
PIONEER VENUS 2 SOUNDER PROBE  
3107 3009  
GS INTERPLANETARY SPACECRAFT  
. PIONEER SPACE PROBES  
. . PIONEER VENUS 2 ENTRY PROBES  
. . . PIONEER VENUS 2 SOUNDER PROBE  
UNMANNED SPACECRAFT  
. SPACE PROBES  
. . PIONEER SPACE PROBES  
. . . PIONEER VENUS 2 ENTRY PROBES  
. . . . PIONEER VENUS 2 SOUNDER PROBE

PIONEER VENUS 2 SPACECRAFT  
3107 3009 3007  
UF PIONEER VENUS 2 MULTIPROBE

# NASA THESAURUS HIERARCHICAL UPDATE

|    |                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GS | SPACECRAFT<br>INTERPLANETARY SPACECRAFT<br>PIONEER VENUS SPACECRAFT<br>PIONEER VENUS 2 SPACECRAFT<br>PIONEER VENUS 2 TRANSPORTER BUS<br>VENUS PROBES<br>PIONEER VENUS 2 SPACECRAFT<br>PIONEER VENUS 2 TRANSPORTER BUS<br>UNMANNED SPACECRAFT<br>PIONEER VENUS SPACECRAFT<br>PIONEER VENUS 2 SPACECRAFT<br>PIONEER VENUS 2 TRANSPORTER BUS<br>PIONEER SPACE PROBES<br>% PROBES<br>% SPACECRAFT | <p>PIONEER SPACE PROBES<br/>PIONEER 3 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 3 SPACE PROBE<br/>JUNO 2 LAUNCH VEHICLE</p> <p>RT</p> <p>PIONEER 4 LUNAR PROBE<br/>USE PIONEER 4 SPACE PROBE</p> <p>PIONEER 4 SPACE PROBE<br/>3007 3108<br/>UF PIONEER 4 LUNAR PROBE<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 4 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 4 SPACE PROBE<br/>JUNO 2 LAUNCH VEHICLE</p> <p>RT</p> <p>PIONEER 5 SPACE PROBE<br/>3007 3108<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 5 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 5 SPACE PROBE<br/>THOR ABLE ROCKET VEHICLE</p> <p>RT</p> <p>PIONEER 6 SPACE PROBE<br/>3108 3007<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 6 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 6 SPACE PROBE<br/>DELTA LAUNCH VEHICLE<br/>JUNO 2 LAUNCH VEHICLE</p> <p>RT</p> <p>PIONEER 7 SPACE PROBE<br/>3108 3007<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 7 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 7 SPACE PROBE<br/>INTERPLANETARY SPACECRAFT</p> <p>PIONEER 3 SPACE PROBE<br/>3007 3108<br/>GS INTERPLANETARY SPACECRAFT</p> | <p>RT DELTA LAUNCH VEHICLE<br/>JUNO 2 LAUNCH VEHICLE</p> <p>PIONEER 8 SPACE PROBE<br/>3108 3007<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 8 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 8 SPACE PROBE<br/>JUNO 2 LAUNCH VEHICLE<br/>% PROBES</p> <p>RT</p> <p>PIONEER 9 SPACE PROBE<br/>3007 3108<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 9 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 9 SPACE PROBE<br/>% PROBES</p> <p>PIONEER 10 SPACE PROBE<br/>1307 3007 3107 3108 3409<br/>UF PIONEER F SPACE PROBE<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 10 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 10 SPACE PROBE<br/>% PROBES</p> <p>RT</p> <p>PIONEER 11 SPACE PROBE<br/>1307 3007 3107 3108 3409<br/>UF PIONEER G SPACE PROBE<br/>GS INTERPLANETARY SPACECRAFT<br/>PIONEER SATURN SPACECRAFT<br/>INTERPLANETARY SPACECRAFT<br/>PIONEER SPACE PROBES<br/>PIONEER 11 SPACE PROBE<br/>UNMANNED SPACECRAFT<br/>SPACE PROBES<br/>PIONEER SPACE PROBES<br/>PIONEER 11 SPACE PROBE<br/>% PROBES</p> <p>RT</p> <p>PIONEER 12 SPACE PROBE<br/>USE PIONEER VENUS SPACECRAFT<br/>PIONS</p> |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |                             |                                       |                       |
|------------------------------------|-----------------------------|---------------------------------------|-----------------------|
| 1504 2308                          |                             |                                       |                       |
| RT COMPRESSING                     | PITCH ANGLES                |                                       | DEGRADATION           |
| FLUID DYNAMICS                     | USE PITCH (INCLINATION)     |                                       | EROSION               |
| PISTONS                            |                             |                                       | EROSIVE BURNING       |
| % THEORIES                         | PITCH ATTITUDE CONTROL      |                                       | ETCHING               |
|                                    | USE LONGITUDINAL CONTROL    |                                       | HOT CORROSION         |
|                                    |                             |                                       | METAL-WATER REACTIONS |
| PISTONS                            | PITCHING MOMENTS            |                                       | % PITS                |
| 1504 2801 2805                     | O201 2102 2308              |                                       | SCORING               |
| GS #PISTONS                        | GS MOMENTS                  |                                       |                       |
| . MAGNETIC PISTONS                 | . STABILITY DERIVATIVES     | PITUITARY GLAND                       |                       |
| COMBUSTION CHAMBERS                | . #PITCHING MOMENTS         | O402 O404 O405                        |                       |
| ENGINE PARTS                       | RT AERODYNAMIC COEFFICIENTS | UF HYPOPHYSIS                         |                       |
| FREE-PISTON ENGINES                | LONGITUDINAL STABILITY      | GS ANATOMY                            |                       |
| INTERNAL COMBUSTION ENGINES        | MOMENTS OF INERTIA          | . GLANDS (ANATOMY)                    |                       |
| PISTON ENGINES                     | ROLLING MOMENTS             | . . ENDOCRINE GLANDS                  |                       |
| PISTON THEORY                      | TORQUE                      | . . #PITUITARY GLAND                  |                       |
| PLUNGERS                           | YAWING MOMENTS              | RT BRAIN                              |                       |
| RECIPROCATION                      |                             | HYPOTHALAMUS                          |                       |
|                                    |                             |                                       |                       |
| % PITCH                            | PITOT TUBES                 | PITUITARY HORMONES                    |                       |
| 1805 1904 2102 3407                | O202 1202 1203 1408 3501    | O404                                  |                       |
| SN (USE OF A MORE SPECIFIC TERM IS | UF PRESTON TUBES            | GS SECRETIONS                         |                       |
| RECOMMENDED--CONSULT THE TERMS     | RT FLOW MEASUREMENT         | . ENDOCRINE SECRETIONS                |                       |
| LISTED BELOW)                      | FLOWMETERS                  | . . HORMONES                          |                       |
| UF TONE                            | PRESSURE MEASUREMENT        | . . #PITUITARY HORMONES               |                       |
| RT FREQUENCIES                     | PROTUBERANCES               | . . . . ADRENOCORTICOTROPIN (ACTH)    |                       |
| PITCH (INCLINATION)                | SPEED INDICATORS            |                                       |                       |
| PITCH (MATERIAL)                   | STATIC PRESSURE             |                                       |                       |
|                                    | % TUBES                     |                                       |                       |
|                                    | VELOCITY MEASUREMENT        | PIV (VELOCIMETRY)                     |                       |
| PITCH (INCLINATION)                | VENTURI TUBES               | USE PARTICLE IMAGE VELOCIMETRY        |                       |
| O101 3006                          |                             |                                       |                       |
| UF DAMPING IN PITCH                |                             | PIVOTED WING AIRCRAFT                 |                       |
| PHUGOID OSCILLATIONS               |                             | USE TILT WING AIRCRAFT                |                       |
| PITCH ANGLES                       |                             |                                       |                       |
| GS ATTITUDE (INCLINATION)          |                             | PIVOTS                                |                       |
| #PITCH (INCLINATION)               |                             | O202                                  |                       |
| ANGLES (GEOMETRY)                  |                             | UF TROCHOIDS                          |                       |
| HEAVING                            |                             | RT BEARINGS                           |                       |
| LONGITUDINAL CONTROL               |                             | GIMBALS                               |                       |
| LONGITUDINAL STABILITY             |                             | HINGES                                |                       |
| % MOTION                           |                             | PINTLES                               |                       |
| % PITCH                            |                             | SHAFTS (MACHINE ELEMENTS)             |                       |
| ROLL                               |                             | SUPPORTS                              |                       |
| ROTATION                           |                             | SWIVELS                               |                       |
| SLOPES                             |                             |                                       |                       |
| STABILITY AUGMENTATION             |                             | PIX USE PLASMA INTERACTION EXPERIMENT |                       |
| VARIABLE PITCH PROPELLERS          |                             |                                       |                       |
| YAW                                |                             |                                       |                       |
|                                    |                             |                                       |                       |
| PITCH (MATERIAL)                   |                             | PIXELS                                |                       |
| 1503 1504                          |                             | 1401                                  |                       |
| RT ASPHALT                         |                             | UF PICTURE ELEMENTS                   |                       |
| OILS                               |                             | GS IMAGERY                            |                       |
| % PITCH                            |                             | #PIXELS                               |                       |
| TARS                               |                             | RT AERIAL PHOTOGRAPHY                 |                       |
|                                    |                             | ELECTROPHOTOMETRY                     |                       |
|                                    |                             | IMAGING TECHNIQUES                    |                       |

PHOTOGRAPHS  
 PHOTOGRAPHY  
 REMOTE SENSING  
 SATELLITE IMAGERY  
 VIDICONS

PL/1  
 O802  
 GS

LANGUAGES  
 .PROGRAMMING LANGUAGES  
 .#PL/1  
 COBOL  
 COMPILERS  
 COMPUTER PROGRAMMING  
 FORTRAN  
 MACHINE ORIENTED LANGUAGES

PLACES (FACULAE)  
 USE FACULAE

PLAINS  
 1306  
 GS

.#PLAINS  
 ..COASTAL PLAINS  
 ..FLOOD PLAINS  
 ..LLANDS ORIENTALES (COLOMBIA)  
 ..PAMPAS  
 ..PLAYAS  
 ..TUNDRA  
 FARMLANDS  
 FLATS (LANDFORMS)  
 GEOGRAPHY  
 GRASSLANDS  
 GREAT PLAINS CORRIDOR (NORTH AMERICA)  
 LANDFORMS  
 PLATEAUS  
 STEPPES  
 TOPOGRAPHY  
 WILDERNESS

PLAN POSITION INDICATORS  
 O705 1002 2102 2103 2104  
 UF  
 PPI (POSITION INDICATORS)  
 GS

.DISPLAY DEVICES  
 .POSITION INDICATORS  
 .#PLAN POSITION INDICATORS  
 .RADARSCOPES  
 .#PLAN POSITION INDICATORS  
 .#PLAN POSITION INDICATORS  
 MEASURING INSTRUMENTS  
 .INDICATING INSTRUMENTS  
 .POSITION INDICATORS  
 .#PLAN POSITION INDICATORS  
 RADAR EQUIPMENT

.RADARSCOPES  
 .#PLAN POSITION INDICATORS

PLANAR STRUCTURES  
 O101 1002 1504 2311 3203  
 RT

FLAT LAYERS  
 FLAT PLATES  
 FLAT SURFACES  
 FLATNESS  
 % STRUCTURES  
 SURFACE PROPERTIES

PLANCKS CONSTANT  
 2401 2402  
 GS

#PLANCKS CONSTANT  
 BLACK BODY RADIATION  
 DE BROGLIE WAVELENGTHS  
 ELECTROMAGNETIC RADIATION  
 NUCLEAR MAGNETIC RESONANCE  
 PHOTONS  
 QUANTUM THEORY  
 THERMAL RADIATION  
 WENTZEL-KRAMER-BRILLOUIN METHOD

PLANE STRAIN  
 1502  
 RT

CRACK PROPAGATION  
 ELASTIC DEFORMATION  
 FRACTURE MECHANICS  
 PLANE STRESS  
 PLASTIC DEFORMATION  
 STRESS INTENSITY FACTORS  
 STRESS-STRAIN RELATIONSHIPS

PLANE STRESS  
 O408 0704 1505 2311 3203  
 GS

STRESSES  
 #PLANE STRESS  
 LOADS (FORCES)  
 PLANE STRAIN  
 STRESS CONCENTRATION

PLANE WAVES  
 O710 2301 2310  
 GS

LONGITUDINAL WAVES  
 #PLANE WAVES  
 BEAMS (RADIATION)  
 CYLINDRICAL WAVES  
 ELASTIC WAVES  
 NORMAL SHOCK WAVES  
 % RADIATION  
 SHOCK WAVES  
 SOLITARY WAVES  
 SOUND WAVES

PLANET EPHEMERIDES  
 3002 3006  
 GS

#PLANET EPHEMERIDES  
 RT

GEOCENTRIC COORDINATES  
 PLANETS

PLANET ORIGINS  
 USE PLANETARY EVOLUTION

PLANETARIUMS  
 3001  
 RT

ASTRONOMICAL MODELS  
 DISPLAY DEVICES

PLANETARY ATMOSPHERES  
 2001 2003 3001 3008 3009  
 SN

(EXCLUDES EARTH ATMOSPHERE)  
 GS

EXTRATERRESTRIAL ENVIRONMENTS  
 .PLANETARY ENVIRONMENTS  
 .#PLANETARY ATMOSPHERES  
 ....HELIUM HYDROGEN ATMOSPHERES  
 ....JUPITER ATMOSPHERE  
 ....MARS ATMOSPHERE  
 ....MERCURY ATMOSPHERE  
 ....NEPTUNE ATMOSPHERE  
 ....PLANETARY IONOSPHERES  
 ....PLUTO ATMOSPHERE  
 ....SATURN ATMOSPHERE  
 ....URANUS ATMOSPHERE  
 ....VENUS ATMOSPHERE  
 .....VENUS CLOUDS

RT % ABSORPTION  
 % ATMOSPHERES  
 ATMOSPHERIC ATTENUATION  
 ATMOSPHERIC COMPOSITION  
 ATMOSPHERIC DENSITY  
 ATMOSPHERIC TEMPERATURE  
 EARTH ATMOSPHERE  
 IONOPAUSE  
 LUNAR ATMOSPHERE  
 NONGRAY ATMOSPHERES  
 ORGANIC SOLIDS  
 PLANETARY METEOROLOGY  
 PLANETARY RINGS  
 PRIMITIVE EARTH ATMOSPHERE  
 RADIATIVE TRANSFER  
 RADIO OCCULTATION

# NASA THESAURUS HIERARCHICAL UPDATE

SATELLITE ATMOSPHERES  
 SATURN RINGS  
 SOLAR PLANETARY INTERACTIONS  
 TERRAFORMING

## PLANETARY BASES

1105 3007  
 RT  
 EXTRATERRESTRIAL RESOURCES  
 SPACE EXPLORATION  
 STATIONS

## PLANETARY BOUNDARY LAYER

1202  
 GS  
 BOUNDARY LAYERS  
 #PLANETARY BOUNDARY LAYER  
 RT  
 ATMOSPHERIC BOUNDARY LAYER

## PLANETARY COMPOSITION

1306 3003 3008 3009  
 GS  
 COMPOSITION (PROPERTY)  
 #PLANETARY COMPOSITION  
 RT  
 EARTH PLANETARY STRUCTURE  
 GAS GIANT PLANETS  
 JUPITER RINGS  
 SATURN RINGS  
 SPACE EXPLORATION  
 STRUCTURAL PROPERTIES (GEOLOGY)

## PLANETARY CORES

2203 3009  
 GS  
 CORES  
 #PLANETARY CORES  
 ..EARTH CORE  
 RT  
 LUNAR CORE  
 PLANETS  
 STELLAR CORES

## PLANETARY CRATERS

3008 1306  
 GS  
 CRATERS  
 #PLANETARY CRATERS  
 ..MARS CRATERS  
 RT  
 EARTH (PLANET)  
 IMPACT DAMAGE  
 MARS (PLANET)  
 MARS SURFACE  
 MERCURY (PLANET)  
 MERCURY SURFACE  
 METEORITE CRATERS  
 PLANETARY GEOLOGY  
 PLANETS  
 VENUS (PLANET)  
 VENUS SURFACE

## PLANETARY CRUSTS

1306 1310 3008  
 GS  
 CRUSTS  
 #PLANETARY CRUSTS  
 ..EARTH CRUST  
 RT  
 LUNAR CRUST  
 PLANETARY GEOLOGY  
 PLANETARY MANTLES

## PLANETARY ENTRY

USE  
 ATMOSPHERIC ENTRY

## PLANETARY ENVIRONMENTS

1105 1301 1302 2001 3008  
 SN  
 (EXCLUDES EARTH)  
 GS  
 ENVIRONMENTS  
 .EXTRATERRESTRIAL ENVIRONMENTS  
 .#PLANETARY ENVIRONMENT  
 ...MARS ENVIRONMENT  
 ....MARS ATMOSPHERE  
 ....PLANETARY ATMOSPHERES  
 ....HELIUM HYDROGEN ATMOSPHERES  
 ....JUPITER ATMOSPHERE  
 ....MARS ATMOSPHERE  
 ....MERCURY ATMOSPHERE  
 ....NEPTUNE ATMOSPHERE  
 ....PLANETARY IONOSPHERES  
 ....PLUTO ATMOSPHERE  
 ....SATURN ATMOSPHERE  
 ....URANUS ATMOSPHERE  
 ....VENUS ATMOSPHERE  
 ....VENUS CLOUDS  
 ...PLANETARY MAGNETOSPHERES  
 ...PLANETARY MAGNETOTAILS  
 AEROSPACE ENVIRONMENTS  
 BIOASTRONAUTICS  
 EXOBIOLOGY  
 LIFE SUPPORT SYSTEMS  
 LONG DURATION SPACE FLIGHT  
 LUNAR ENVIRONMENT  
 PLANETS  
 PROTOPLANETS  
 TERRAFORMING  
 TERRESTRIAL PLANETS  
 THERMAL ENVIRONMENTS

RT

## PLANETARY EVOLUTION

1306 3001 3003 3008  
 UF  
 PLANET ORIGINS  
 GS  
 EVOLUTION (DEVELOPMENT)  
 #PLANETARY EVOLUTION  
 RT  
 COSMOLOGY  
 PLANETARY GEOLOGY  
 PROTOPLANETS  
 SOLAR SYSTEM EVOLUTION  
 STELLAR EVOLUTION

PLANETARY EXPLORATION  
 USE  
 SPACE EXPLORATION

PLANETARY EXPLORER  
 USE  
 OUTER PLANETS EXPLORERS

## PLANETARY GEOLOGY

1301 1306 3009

GS  
 #PLANETARY GEOLOGY

.MARS VOLCANOES

RT  
 LUNAR GEOLOGY

PLANETARY CRATERS

PLANETARY CRUSTS

PLANETARY EVOLUTION

PLANETARY STRUCTURE

PLANETARY SURFACES

PLANETOLOGY

PLANETS

REMOTE SENSING

SOLAR SYSTEM

SPACE EXPLORATION

## PLANETARY GRAVITATION

1105 1309 3002 3008

GS  
 GRAVITATION

RT  
 #PLANETARY GRAVITATION

ESCAPE VELOCITY

LUNAR GRAVITATION

## PLANETARY IONOSPHERES

2001 2003 3001 3008 3009

SN  
 (EXCLUDES EARTH IONOSPHERE)

GS  
 ENVIRONMENTS

.EXTRATERRESTRIAL ENVIRONMENTS

...PLANETARY ENVIRONMENTS

...PLANETARY ATMOSPHERES

...#PLANETARY IONOSPHERES

RT  
 % ATMOSPHERES

%  
 IONOSPHERES

JUPITER ATMOSPHERE

MAGNETOSPHERE-IONOSPHERE COUPLING

MARS ATMOSPHERE

NEPTUNE ATMOSPHERE

SATURN ATMOSPHERE

URANUS ATMOSPHERE

VENUS ATMOSPHERE

## PLANETARY LANDING

0203 3002 3006 3007 3110 3201

SN  
 (EXCLUDES LANDING ON THE PLANET

EARTH)

GS  
 LANDING

.SPACECRAFT LANDING

.#PLANETARY LANDING

|                           |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                        | CRASH LANDING<br>GLIDE LANDINGS<br>HARD LANDING<br>HORIZONTAL SPACECRAFT LANDING<br>INTERPLANETARY FLIGHT<br>LUNAR LANDING<br>MARS LANDING<br>ORBITAL MECHANICS<br>ROVING VEHICLES<br>SOFT LANDING<br>WATER LANDING                             | % MAGNETOTAILS<br>PLANETARY MAGNETIC FIELDS<br>SOLAR PLANETARY INTERACTIONS<br>SOLAR WIND | #PLANETARY ORBITS<br>AMOR ASTEROID<br>APOLLO ASTEROIDS<br>CHARON<br>CIRCULAR ORBITS<br>EARTH ORBITS<br>ELLIPTICAL ORBITS<br>EQUATORIAL ORBITS<br>INTERPLANETARY TRAJECTORIES<br>ORBITAL RESONANCES (CELESTIAL MECHANICS)<br>PARKING ORBITS<br>POLAR ORBITS<br>SATELLITE ORBITS<br>SPACECRAFT ORBITS<br>SWINGBY TECHNIQUE<br>TRANSFER ORBITS<br>TWENTY-FOUR HOUR ORBITS<br>VIKING ORBITER SPACECRAFT |
| PLANETARY LIMB            |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| O508 3009                 |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| RT                        | EARTH LIMB                                                                                                                                                                                                                                      |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| % LIMBS                   |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| LUNAR LIMB                |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| SOLAR LIMB                |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| PLANETARY MAGNETIC FIELDS |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2307 3008                 |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| GS                        | MAGNETIC FIELDS                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| RT                        | #PLANETARY MAGNETIC FIELDS<br>GEOMAGNETIC TAIL<br>GEOMAGNETISM<br>PLANETARY MAGNETOSPHERES<br>PLANETARY MAGNETOTAILS<br>POLAR CUSPS<br>SOLAR PLANETARY INTERACTIONS                                                                             |                                                                                           | PLANETARY QUAKES<br>3007 3008<br>RT EARTHQUAKES<br>GEODYNAMICS<br>MOONQUAKES<br>SEISMIC WAVES<br>SHOCK WAVES                                                                                                                                                                                                                                                                                        |
| PLANETARY MAGNETOSPHERES  |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1105 1301 1302 2001 3008  |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| SN                        | (EXCLUDES EARTH MAGNETOSPHERE)                                                                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| GS                        | ENVIRONMENTS<br>..EXTRATERRESTRIAL ENVIRONMENTS<br>..PLANETARY ENVIRONMENTS<br>...#PLANETARY MAGNETOSPHERES<br>....PLANETARY MAGNETOTAILS<br>EARTH MAGNETOSPHERE<br>MAGNETOSPHERES<br>PLANETARY MAGNETIC FIELDS<br>SOLAR PLANETARY INTERACTIONS |                                                                                           | PLANETARY QUARANTINE<br>O404 0504<br>RT SPACECRAFT STERILIZATION                                                                                                                                                                                                                                                                                                                                    |
| PLANETARY MAGNETOTAILS    |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2502 3001 3007 3008       |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| SN                        | (EXCLUDES EARTH'S MAGNETOTAIL; FOR EARTH USE 'GEOMAGNETIC TAIL')                                                                                                                                                                                |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| GS                        | ENVIRONMENTS<br>..EXTRATERRESTRIAL ENVIRONMENTS<br>...PLANETARY ENVIRONMENTS<br>....PLANETARY MAGNETOSPHERES<br>....#PLANETARY MAGNETOTAILS<br>EXOSPHERE<br>MAGNETOTAIL<br>MAGNETOPAUSE                                                         |                                                                                           | PLANETARY RADIATION<br>2903 3008<br>SN (EXCLUDES TERRESTRIAL RADIATION)<br>GS ELECTROMAGNETIC RADIATION<br>#PLANETARY RADIATION<br>EXTRATERRESTRIAL RADIATION<br>#PLANETARY RADIATION<br>RT ALBEDO<br>DECIMETER WAVES<br>INFRARED RADIATION<br>LIGHT (VISIBLE RADIATION)<br>% RADIATION<br>RADIO WAVES<br>SATURN ATMOSPHERE<br>TERRESTRIAL RADIATION<br>THERMAL RADIATION<br>VLF EMISSION RECORDERS |
| RT                        |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| PLANETARY RINGS           |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3003                      |                                                                                                                                                                                                                                                 |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| GS                        | CELESTIAL BODIES<br>#PLANETARY RINGS<br>..JUPITER RINGS                                                                                                                                                                                         |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |

[illegible]

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..VARIABLE SWEEP WINGS
RT % BODIES
% CROSS SECTIONS
GEOMETRY
% PROFILES
SHAPES
% SURFACE GEOMETRY

PLANING
USE TOMOGRAPHY

PLANKTON
1504
SN (EXCLUDES MOTION INVOLVING DYNAMIC
SUPPORTING FORCES)
GS CUTTING
#PLANING
RT GRINDING (MATERIAL REMOVAL)
MACHINING
METAL CUTTING
MILLING (MACHINING)
SLICING
SMOOTHING

PLANKTON BLOOM
USE PLANKTON

PLANNING
3406
GS #PLANNING
.AIRPORT PLANNING
.MANAGEMENT PLANNING
..PRODUCTION PLANNING

..PROJECT PLANNING
.MISSION PLANNING
.REGIONAL PLANNING
..URBAN PLANNING
.TASK PLANNING (ROBOTICS)
.TRAJECTORY PLANNING
BUDGETING
CRITICAL PATH METHOD
DELPHI METHOD (FORECASTING)
% DESIGN
FORECASTING
% MISSIONS
OPTIMIZATION
PATTERN METHOD (FORECASTING)
PROBE METHOD (FORECASTING)
PRODUCTION ENGINEERING
PROFILE METHOD (FORECASTING)
PROGRESS
SEQUENCING
SLICING
STARSITE PROGRAM
TRAINING ANALYSIS
URBAN DEVELOPMENT

PLANT DESIGN
3402
SN (EXCLUDES BIOLOGICAL PLANTS)
RT ARCHITECTURE
% DESIGN
STRUCTURAL DESIGN

PLANT DISEASES
0404 0405 0408 0409 0410 0412
UF DISEASED VEGETATION
GS #PLANT DISEASES
.BLIGHT
RT AGRICULTURE
CROP GROWTH
CROP IDENTIFICATION
CROP VIGOR
DISEASES
FUNGI
PLANT STRESS
PLANTS (BOTANY)
RUST FUNGI

PLANT ROOTS
0404 0409
RT BULBS
PLANTS (BOTANY)
% ROOTS
VEGETATION GROWTH

PLANT STRESS
0408
RT AERIAL PHOTOGRAPHY
AGRICULTURE
CROP GROWTH
CROP VIGOR
EARTH RESOURCES PROGRAM
PLANT DISEASES
REMOTE SENSING
SOIL MOISTURE
SPECTRAL REFLECTANCE
VEGETATION GROWTH

PLANTAR TISSUES
0404
GS TISSUES (BIOLOGY)
#PLANTAR TISSUES

PLANTING
0404 0409
RT AGRICULTURE
% CROPS
CULTIVATION
FARM CROPS
FARMLANDS
FERTILIZERS

..PROJECT PLANNING
.MISSION PLANNING
.REGIONAL PLANNING
..URBAN PLANNING
.TASK PLANNING (ROBOTICS)
.TRAJECTORY PLANNING
BUDGETING
CRITICAL PATH METHOD
DELPHI METHOD (FORECASTING)
% DESIGN
FORECASTING
% MISSIONS
OPTIMIZATION
PATTERN METHOD (FORECASTING)
PROBE METHOD (FORECASTING)
PRODUCTION ENGINEERING
PROFILE METHOD (FORECASTING)
PROGRESS
SEQUENCING
SLICING
STARSITE PROGRAM
TRAINING ANALYSIS
URBAN DEVELOPMENT

PLANDOTRONS
2309 2402
UF AMPLITRONS (TRADEMARK)
GS AMPLIFIERS
.MICROWAVE AMPLIFIERS
.#PLANDOTRONS
ELECTRON TUBES
.VACUUM TUBES
..MICROWAVE TUBES
.#PLANDOTRONS
MICROWAVE EQUIPMENT
.MICROWAVE AMPLIFIERS
.#PLANDOTRONS
.MICROWAVE TUBES
.#PLANDOTRONS
CAMERA TUBES
ELECTRIC ARCS
MAGNETRONS

RT

% PLANS
3406 3409
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT DRAWINGS
FLIGHT PLANS
LAYOUTS
MISSION PLANNING
PAYLOAD INTEGRATION PLAN
URBAN DEVELOPMENT

PLANKTON BLOOM
USE PLANKTON

PLANNING
3406
GS #PLANNING
.AIRPORT PLANNING
.MANAGEMENT PLANNING
..PRODUCTION PLANNING

```

# NASA THESAURUS HIERARCHICAL UPDATE

## PLANTS (BOTANY)

PLOWING  
PLOW  
SEEDS  
SILVICULTURE  
SOILS  
TRACTORS  
VEGETABLES

## PLANTS (BOTANY)

O404 O409  
UF FLORA  
GS #PLANTS (BOTANY)

ALFALFA

ALGAE

BLUE GREEN ALGAE

ANABAENA

MICROCYSTIS

NOSTOC

CHLORELLA

DUNALIELLA

PORPHYRA

SCENEDESMUS

AQUATIC PLANTS

PHYTOPLANKTON

BARLEY

BRUSH (BOTANY)

CHAPARRAL

BRYOPHYTES

CORN

COTTON

FUNGI

ASPERGILLUS

COCCOMYCES

GIBBERELLINS

NEUROSPORA

RHIZOPUS

RUST FUNGI

SACCHAROMYCES

YEAST

GRASSES

HAY

REEDS (PLANTS)

SEA GRASSES

SORGHUM

GUAYULE

LEGUMINOUS PLANTS

SOYBEANS

LICHENS

MILLET

NIGELLA

OATS

PHOTOPHILIC PLANTS

PHREATOPHYTES

POTATOES

RICE

SAPROPHYTES

SPINACH

SUGAR BEETS

SUGAR CANE

SUNFLOWERS

THERMOPHILIC PLANTS

BLUE GREEN ALGAE

NOSTOC

TOBACCO

TRADESCANTIA

TRAGACANTH

TREES (PLANTS)

CITRUS TREES

CONIFERS

DECIDUOUS TREES

AGRICULTURE

ANGIOSPERMS

ANIMALS

BIOCHEMICAL OXYGEN DEMAND

BIOGEOCHEMISTRY

BIOMASS

BLIGHT

BOTANY

CANOPIES (VEGETATION)

CARBON CYCLE

CHLOROPHYLLS

CORTEXES (BOTANY)

CROP GROWTH

CROP VIGOR

DEFOLIANTS

DEFOLIATION

EARTH RESOURCES

ENVIRONMENTS

FARM CROPS

FOLIAGE

FOOD CHAIN

FORESTS

FROST DAMAGE

GEOBOTANY

GEOTROPISM

GRAVITROPISM

GREENHOUSES

HALOPHILES

HERBICIDES

HETEROTROPHS

HYDROPONICS

INFESTATION

LACUNAS

LEAVES

MICROORGANISMS

MICROSPORES

MITRA

ORCHARDS

ORGANISMS

PETALS

PHOTOTROPISM

PHYTOTRONS

PLANKTON

PLANT DISEASES

PLANT ROOTS

PLANTING

PLOWING

POLLEN

RAIN FORESTS

SEEDS

SPORES

STEMS

UTRICLE

VEGETATION

VIABILITY

VINEYARDS

WOOD

PLANTS (INDUSTRIES)

USE INDUSTRIAL PLANTS

PLASMA ACCELERATION

2502 3009

UF

MAGNETOHYDRODYNAMIC ACCELERATION

GS

RATES (PER TIME)

ACCELERATION (PHYSICS)

PLASMA ACCELERATION

RT % ACCELERATION

ACCELERATION

PARTICLE ACCELERATION

PLASMAS (PHYSICS)

WAVE PROPAGATION

WAVE-PARTICLE INTERACTIONS

PLASMA ACCELERATORS

O905 2501 2502

GS

PLASMA ACCELERATORS

ALPHA PLASMA DEVICES

COAXIAL PLASMA ACCELERATORS

CYCLOPS PLASMA ACCELERATOR

RT % ACCELERATORS

ELECTROMAGNETIC ACCELERATION

ION INJECTION

MAGNETIC ANNULAR ARC

MAGNETOHYDRODYNAMIC GENERATORS

PLASMAS (PHYSICS)

PLASMA ANTENNAS

O701

GS

ANTENNAS

PLASMA ANTENNAS

RT

ANTENNA DESIGN

ANTENNA RADIATION PATTERNS

PLASMA CYLINDERS

SATELLITE COMMUNICATION

## SPACECRAFT COMMUNICATION

PLASMA 1507  
RT  
ARC CUTTING  
METAL CUTTING  
METAL WORKING  
PLASMA ARC WELDING  
PLASMA TORCHES  
PLASMAS (PHYSICS)

PLASMA  
USE ARC SPRAYING  
ARC SPRAYING

PLASMA 1507  
GS  
ARC WELDING  
1704 2501  
WELDING  
. FUSION WELDING  
.. ELECTRIC WELDING  
... ARC WELDING  
... #PLASMA ARC WELDING  
PLASMA ARC CUTTING  
PLASMA TORCHES  
PLASMAS (PHYSICS)

PLASMA  
USE ARCS  
PLASMA JETS

PLASMA BUBBLES

1302  
RT  
F REGION  
PLASMA DENSITY

PLASMA 0604  
RT %  
CHEMISTRY  
CHEMISTRY  
NUCLEAR CHEMISTRY  
PLASMAS (PHYSICS)

PLASMA 2502  
GS  
CLOUDS  
2902  
PARTICLES  
. CHARGED PARTICLES  
. #PLASMA CLOUDS  
... MAGNETIC CLOUDS  
RT CHEMICAL CLOUDS  
% CLOUDS  
COSMIC PLASMA  
EARTH MAGNETOSPHERE  
GEOMAGNETIC HOLLOW  
HYDROGEN CLOUDS  
INTERPLANETARY MEDIUM  
ION SHEATHS  
PLASMAPAUSE  
PLASMAS (PHYSICS)

PLASMA 2402  
GS  
COMPOSITION (PROPERTY)  
#PLASMA COMPOSITION  
RT ATOM CONCENTRATION  
GAS COMPOSITION  
ION MOTION  
IONOSPHERIC COMPOSITION  
NONEQUILIBRIUM PLASMAS  
NONUNIFORM PLASMAS  
PLASMAS (PHYSICS)  
THOMAS-FERMI MODEL  
URANIUM PLASMAS

PLASMA 2501  
GS  
COMPRESSION  
COMPRESSION  
#PLASMA COMPRESSION  
RT CONTROLLED FUSION  
DENSE PLASMAS  
INERTIAL FUSION (REACTOR)  
MAGNETIC EFFECTS  
MAGNETIC FIELD CONFIGURATIONS  
PINCH EFFECT  
PLASMA FOCUS  
PLASMA PRESSURE  
PLASMAS (PHYSICS)  
STRONGLY COUPLED PLASMAS  
THETA PINCH  
TOKAMAK DEVICES  
ZETA PINCH

PLASMA 1002  
GS  
CONDUCTIVITY  
2302 2402 2502  
ELECTRICAL PROPERTIES  
. ELECTRICAL RESISTIVITY  
. #PLASMA CONDUCTIVITY  
TRANSPORT PROPERTIES  
. ELECTRICAL RESISTIVITY  
. #PLASMA CONDUCTIVITY  
RT COLLISIONAL PLASMAS  
% CONDUCTIVITY  
IONOSPHERIC CONDUCTIVITY  
MAGNETOHYDRODYNAMIC STABILITY  
PLASMAS (PHYSICS)  
STRONGLY COUPLED PLASMAS

PLASMA  
USE CONFINEMENT  
PLASMA CONTROL

PLASMA 2502  
UF  
CONTROL  
PLASMA CONFINEMENT  
RT BALLOONING MODES  
BETA FACTOR

BUMPY TORUSES  
CONFINEMENT  
% CONTROL  
CROSSED FIELD GUNS  
CROSSED FIELDS  
ELECTRON-ION RECOMBINATION  
ELLIPTICAL PLASMAS  
HELICAL INDUCERS  
HELICAL WINDINGS  
HELIOTRONS  
LIMITERS (FUSION REACTORS)  
MAGNETIC ANNULAR ARC  
MAGNETIC COMPRESSION  
MAGNETIC FIELD CONFIGURATIONS  
MAGNETIC MIRRORS  
MAGNETICALLY TRAPPED PARTICLES  
MIRROR FUSION  
PINCH EFFECT  
PLASMAS (PHYSICS)  
REVERSE FIELD PINCH  
RIGID ROTORS (PLASMA PHYSICS)  
SCREW PINCH  
SPHEROMAKS  
STELLARATORS  
TANDEM MIRRORS  
THERMAL BARRIERS (PLASMA CONTROL)  
TOKAMAK DEVICES  
TOROIDAL PLASMAS  
TRANSFORMERS  
TRAP PROGRAM  
TRAPPED MAGNETIC FIELDS  
ZETA PINCH

PLASMA 2502  
GS  
COOLING  
#PLASMA COOLING  
RT CONTROLLED FUSION  
MAGNETOHYDRODYNAMIC STABILITY  
PLASMAS (PHYSICS)  
TEMPERATURE CONTROL

PLASMA 2203  
GS  
CORE REACTORS  
NUCLEAR REACTORS  
#PLASMA CORE REACTORS  
RT CRITICAL MASS  
NUCLEAR POWER PLANTS  
NUCLEAR RESEARCH  
PLASMAS (PHYSICS)  
RADIOACTIVE WASTES  
REACTOR CORES  
% REACTORS  
REFLECTORS  
WASTE DISPOSAL



## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

STRONGLY COUPLED PLASMAS

PLASMA ETCHING

O604  
RT PLASMAS (PHYSICS)  
SPUTTERING

PLASMA FLOW  
USE MAGNETOHYDRODYNAMIC FLOW

PLASMA FLUX MEASUREMENT

O710 2502  
RT INTERFEROMETRY  
MAGNETOHYDRODYNAMIC FLOW  
MICROWAVE PLASMA PROBES  
PLASMAS (PHYSICS)  
ROTATING PLASMAS  
SPECKLE INTERFEROMETRY

PLASMA FOCUS

2402  
GS FOCI  
#PLASMA FOCUS  
PARTICLES

.CHARGED PARTICLES  
..ENERGETIC PARTICLES  
...PLASMAS (PHYSICS)  
....DENSE PLASMAS  
.....#PLASMA FOCUS  
NUCLEAR FUSION  
PLASMA COMPRESSION  
STRONGLY COUPLED PLASMAS  
ZETA PINCH

PLASMA FREQUENCIES

1002 2403 2502  
GS FREQUENCIES  
#PLASMA FREQUENCIES  
ELECTRON DENSITY (CONCENTRATION)  
ELECTROSTATIC PROBES  
FREE ELECTRONS  
PLASMAS (PHYSICS)  
PLASMONS

PLASMA GENERATION

USE PLASMA GENERATORS

PLASMA GENERATORS

1002 1203 1504 2501 2502 2702  
SN (EXCLUDES MAGNETOHYDRODYNAMIC OR  
THERMONUCLEAR GENERATORS OF  
ELECTRIC POWER)  
PLASMA GENERATION  
GS #PLASMA GENERATORS  
.PLASMA GUNS

.PLASMATRONS  
..DUOPLASMATRONS  
.SCYLLA

.TOKAMAK DEVICES  
..JOINT EUROPEAN TORUS  
ARC CHAMBERS

RT

ARC GENERATORS  
CLOSED CYCLES  
COLLOIDAL GENERATORS  
ELECTRIC ARCS  
EXPLODING WIRES

% GENERATORS

HALL GENERATORS  
HIGH TEMPERATURE RESEARCH  
ION INJECTION  
ION SOURCES

MAGNETOHYDRODYNAMIC GENERATORS  
PENNING DISCHARGE  
PLASMAS (PHYSICS)  
PULSE GENERATORS

THERMAL PLASMAS  
THERMONUCLEAR POWER GENERATION  
WIND TUNNEL DRIVES

PLASMA GUNS

1002 1203 2501 2702  
GS PLASMA GENERATORS  
#PLASMA GUNS  
COAXIAL PLASMA ACCELERATORS  
CROSSED FIELD GUNS  
ELECTRON GUNS  
% GUNS  
MAGNETIC LENSES  
PLASMAS (PHYSICS)  
PLASMATRONS

PLASMA HEATING

2502  
GS HEATING  
#PLASMA HEATING  
..ELECTRON CYCLOTRON HEATING  
ARC HEATING  
BEAM INJECTION  
BETA FACTOR  
BUMPY TORUSES  
ENERGY TRANSFER  
GAS HEATING  
INDUCTION HEATING  
IONOSPHERIC HEATING  
KINETIC HEATING  
MAGNETIC PUMPING  
MAGNETOHYDRODYNAMIC SHEAR HEATING  
PLASMA TEMPERATURE  
PLASMAS (PHYSICS)  
RADIO FREQUENCY HEATING

RT

RELATIVISTIC ELECTRON BEAMS  
SHOCK HEATING

PLASMA INSTABILITY

USE MAGNETOHYDRODYNAMIC STABILITY

PLASMA INTERACTION EXPERIMENT

1203  
UF PIX  
GS PAYLOADS  
.SPACE SHUTTLE PAYLOADS  
..#PLASMA INTERACTION EXPERIMENT  
SPACEBORNE EXPERIMENTS  
#PLASMA INTERACTION EXPERIMENT  
RT % INTERACTIONS  
LANDSAT 3  
PLASMAS (PHYSICS)  
SPACE DENSITY  
SPHINX

PLASMA INTERACTIONS

O710 2402 2502  
GS #PLASMA INTERACTIONS  
.PLASMA-ELECTROMAGNETIC INTERACTION  
..LASER PLASMA INTERACTIONS  
.PLASMA-PARTICLE INTERACTIONS  
RT % INTERACTIONS  
PLASMAS (PHYSICS)  
SOLAR PLANETARY INTERACTIONS  
SPACE PLASMAS  
WAVE INTERACTION  
WAVE-PARTICLE INTERACTIONS  
WEIBEL INSTABILITY

PLASMA JET SYNTHESIS

2501 2502  
RT CHEMICAL REACTIONS  
PLASMAS (PHYSICS)  
% SYNTHESIS

PLASMA JET WIND TUNNELS

1110  
UF HYDRODYNAMIC TUNNELS  
GS TEST FACILITIES  
.WIND TUNNELS  
..HYPERSONIC WIND TUNNELS  
..#PLASMA JET WIND TUNNELS  
..HYPERVELOCITY WIND TUNNELS  
..#PLASMA JET WIND TUNNELS  
RT PLASMAS (PHYSICS)

PLASMA JETS

2502 3009  
UF PLASMA ARCS  
PLASMA DISCHARGES

[illegible]

|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAGNETIC ANNULAR ARC<br>MAGNETOHYDRODYNAMICS<br>MAGNETOPLASMA DYNAMICS<br>NUCLEAR ELECTRIC PROPULSION<br>PLASMAS (PHYSICS)<br>PLASMATRONS                                                                                                                   | RT                                                                                                                                                                                                              | BLACKOUT (PROPAGATION)<br>BOUNDARY LAYER PLASMAS<br>ION SHEATHS<br>MAGNETOHYDRODYNAMIC SHEAR HEATING<br>MAGNETOSHEATH<br>METALLIC PLASMAS<br>MISSILES<br>NONEQUILIBRIUM PLASMAS<br>PLASMAS (PHYSICS)<br>REENTRY COMMUNICATION<br>REENTRY EFFECTS<br>REENTRY PHYSICS<br>SYSTEM GENERATED ELECTROMAGNETIC<br>PULSES<br>UNCONTROLLED REENTRY (SPACECRAFT) | #PLASMA TEMPERATURE<br>ION TEMPERATURE<br>MAGNETOHYDRODYNAMIC STABILITY<br>PLASMA HEATING<br>PLASMAS (PHYSICS)<br>THERMAL PLASMAS                                                                                                                                                                                                                                                                                                                                                                                                      |
| PLASMA PUMPING<br>1501<br>RT<br>% PUMPING                                                                                                                                                                                                                   |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                        | PLASMA THEORY<br>USE PLASMA PHYSICS<br>PLASMA TORCHES<br>1507<br>RT PLASMA ARC CUTTING<br>PLASMA ARC WELDING<br>PLASMA JETS<br>PLASMAS (PHYSICS)                                                                                                                                                                                                                                                                                                                                                                                       |
| PLASMA RADIATION<br>2402 2502<br>RT                                                                                                                                                                                                                         |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ELECTRON RADIATION<br>FLUORESCENCE<br>GLOW DISCHARGES<br>ION CYCLOTRON RADIATION<br>LASER INDUCED FLUORESCENCE<br>LUMINESCENCE<br>NONEQUILIBRIUM PLASMAS<br>OPTICAL RESONANCE<br>PHOSPHORESCENCE<br>PLASMAS (PHYSICS)<br>POLARIZED RADIATION<br>% RADIATION | PLASMA SLABS<br>2502<br>GS<br>PARTICLES<br>.CHARGED PARTICLES<br>.#PLASMA SLABS<br>RT MAGNETOHYDRODYNAMIC STABILITY<br>PLASMAS (PHYSICS)<br>PLASMA SOUND WAVES<br>USE MAGNETOHYDRODYNAMIC WAVES<br>PLASMA WAVES | PLASMA TURBULENCE<br>1203 2502 3304<br>GS TURBULENCE<br>.MAGNETOHYDRODYNAMIC TURBULENCE<br>.#PLASMA TURBULENCE<br>RT MAGNETOHYDRODYNAMIC FLOW<br>MAGNETOHYDRODYNAMIC STABILITY<br>PLASMAS (PHYSICS)                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| RELATIVISTIC PLASMAS<br>PLASMA RENIN ACTIVITY<br>USE IMMUNOASSAY                                                                                                                                                                                            | PLASMA SPECTRA<br>1411 2502<br>GS SPECTRA<br>#PLASMA SPECTRA<br>RT EMISSION SPECTRA<br>ENERGY SPECTRA<br>OPTICAL RESONANCE<br>PLASMAS (PHYSICS)<br>RADIATION SPECTRA                                            |                                                                                                                                                                                                                                                                                                                                                        | PLASMA WAVES<br>0705 0710 1002 2402 2403 2502<br>UF PLASMA SOUND WAVES<br>GS ELASTIC WAVES<br>.MAGNETOHYDRODYNAMIC WAVES<br>.#PLASMA WAVES<br>...ELECTROSTATIC WAVES<br>COLLISIONAL PLASMAS<br>DIFFUSION WAVES<br>ELECTROACOUSTIC WAVES<br>ELECTRON PLASMA<br>ION ACOUSTIC WAVES<br>ION CYCLOTRON RADIATION<br>IONIC WAVES<br>LANDAU DAMPING<br>MAGNETOACOUSTIC WAVES<br>MAGNETOELASTIC WAVES<br>NONUNIFORM PLASMAS<br>PLASMA DRIFT<br>PLASMAS (PHYSICS)<br>SHOCK WAVES<br>SPACE PLASMAS<br>WAVE PACKETS<br>WAVE-PARTICLE INTERACTIONS |
| PLASMA RESONANCE<br>2307 2502<br>GS RESONANCE<br>#PLASMA RESONANCE<br>RT CAVITONS<br>CYCLOTRON RESONANCE<br>ELECTROMAGNETIC INTERACTIONS<br>PLASMAS (PHYSICS)<br>RESONANCE LINES<br>RESONANCE PROBES                                                        | PLASMA SPRAYING<br>1801 1802 2501<br>GS SPRAYING<br>#PLASMA SPRAYING<br>RT COATING<br>COATINGS<br>FLAME SPRAYING<br>METAL MATRIX COMPOSITES<br>PLASMAS (PHYSICS)<br>SPRAYED COATINGS                            |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| PLASMA RINGS<br>USE TOROIDAL PLASMAS                                                                                                                                                                                                                        | PLASMA STABILITY<br>USE MAGNETOHYDRODYNAMIC STABILITY                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| PLASMA SHEATHS<br>0205 0705 1203 2307 2402 2502<br>GS PARTICLES<br>.CHARGED PARTICLES<br>..PLASMA LAYERS<br>..#PLASMA SHEATHS<br>SHEATHS<br>#PLASMA SHEATHS                                                                                                 | PLASMA TEMPERATURE<br>1408 2502<br>GS TEMPERATURE                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                        | PLASMA-ELECTROMAGNETIC INTERACTION<br>2403 2502<br>GS ELECTROMAGNETIC INTERACTIONS<br>#PLASMA-ELECTROMAGNETIC INTERACTION                                                                                                                                                                                                                                                                                                                                                                                                              |

# NASA THESAURUS HIERARCHICAL UPDATE

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..LASER PLASMA INTERACTIONS
PLASMA INTERACTIONS
#PLASMA-ELECTROMAGNETIC INTERACTION
..LASER PLASMA INTERACTIONS
ELECTROMAGNETIC COUPLING
RT
% INTERACTIONS
PLASMAS (PHYSICS)
SPACE PLASMAS
WAVE-PARTICLE INTERACTIONS

PLASMA-PARTICLE INTERACTIONS
2403 2502
GS PARTICLE INTERACTIONS
#PLASMA-PARTICLE INTERACTIONS
PLASMA INTERACTIONS
#PLASMA-PARTICLE INTERACTIONS
BEAM INJECTION
BEAM PLASMA AMPLIFIERS
CHARGE EXCHANGE
ELECTRON PHONON INTERACTIONS
ELECTRON PLASMA
% INTERACTIONS
PARTICLE THEORY
PLASMA CURRENTS
PLASMAS (PHYSICS)
RELATIVISTIC ELECTRON BEAMS
RELATIVISTIC PLASMAS
SPHINX
WAVE-PARTICLE INTERACTIONS

PLASMA DYNAMIC LASERS
1601
GS STIMULATED EMISSION DEVICES
.LASERS
.#PLASMA DYNAMIC LASERS
COHERENT LIGHT
RT
GAS DYNAMIC LASERS
LASER APPLICATIONS
PLASMAS (PHYSICS)

PLASMA GUIDES
0710 2402 2502
GS WAVE GUIDES
#PLASMA GUIDES
BEAM WAVE GUIDES
EARTH-IONOSPHERE WAVEGUIDE
ELECTROMAGNETIC WAVE TRANSMISSION
MICROWAVE PLASMA PROBES
PLASMA CYLINDERS
PLASMA ELECTRODES
PLASMA PROBES
PLASMAS (PHYSICS)
WAVE PROPAGATION

PLASMA PAUSE
3001 1302 3003 3009 1307
SN (LIMITED TO EARTH'S ATMOSPHERE)
RT COSMIC PLASMA
EARTH MAGNETOSPHERE
IONOPAUSE
PLASMA CLOUDS
PLASMA OSCILLATIONS
PLASMA PHYSICS
PLASMAS (PHYSICS)
SOLAR WIND

PLASMAS (PHYSICS)
2501 2502 3009
SN (LIMITED TO COMPLETELY IONIZED
MATTER; FOR PARTIALLY IONIZED
GASES SEE IONIZED GASES)
UF ELECTROSTATIC PLASMA
IONIZED PLASMAS
MAGNETOIONIC PLASMA
MAGNETOPLASMAS
PLASMOIDS
GS PARTICLES
.CHARGED PARTICLES
..ENERGETIC PARTICLES
..#PLASMAS (PHYSICS)
....ARGON PLASMA
....BETA PARTICLES
....BOUNDARY LAYER PLASMAS
....COLD PLASMAS
....COLLISIONAL PLASMAS
....STRONGLY COUPLED PLASMAS
....COLLISIONLESS PLASMAS
....COSMIC PLASMA
....CYLINDRICAL PLASMAS
....DENSE PLASMAS
....PLASMA FOCUS
....STRONGLY COUPLED PLASMAS
....ELECTRON PLASMA
....ELECTRON-POSITRON PLASMAS
....ELLIPTICAL PLASMAS
....HELIUM PLASMA
....HIGH TEMPERATURE PLASMAS
....HYDROGEN PLASMA
....DEUTERIUM PLASMA
....LASER PLASMAS
....METALLIC PLASMAS
....CESIUM PLASMA
....MICROPLASMAS
....NITROGEN PLASMA
....NONEQUILIBRIUM PLASMAS
....NONUNIFORM PLASMAS
....OXYGEN PLASMA
....RAREFIED PLASMAS
....RELATIVISTIC PLASMAS
....ROTATING PLASMAS

.....SEMICONDUCTOR PLASMAS
.....SPACE PLASMAS
.....SOLAR WIND
.....STELLAR WINDS
.....SPHERICAL PLASMAS
.....THERMAL PLASMAS
.....TOROIDAL PLASMAS
ALPHA PLASMA DEVICES
BEAM PLASMA AMPLIFIERS
BLACKOUT (PROPAGATION)
CHEMICAL ELEMENTS
COMBUSTION PHYSICS
CORE FLOW
CYCLOPS PLASMA ACCELERATOR
DEBYE LENGTH
DEUTERON IRRADIATION
DEUTERONS
DUOPLASMATRONS
ELECTRIC ARCS
ELECTRON ENERGY
GASES
HIGH TEMPERATURE FLUIDS
IONIZED GASES
IONS
KELVIN-HELMHOLTZ INSTABILITY
LANDAU FACTOR
LASER FUSION
LASER PLASMA INTERACTIONS
LIGHT IONS
LIQUID EQUATIONS
LOW DENSITY RESEARCH
MAGNETIC COMPRESSION
MAGNETOHYDRODYNAMIC FLOW
MAGNETOHYDRODYNAMIC STABILITY
MAGNETOHYDRODYNAMICS
MAGNETOIONICS
MICROWAVE PLASMA PROBES
NEUTRAL GASES
ONSAGER PHENOMENOLOGICAL
COEFFICIENT
% PHYSICS
PLASMA ACCELERATION
PLASMA ACCELERATORS
PLASMA ARC CUTTING
PLASMA ARC WELDING
PLASMA CHEMISTRY
PLASMA CLOUDS
PLASMA COMPOSITION
PLASMA COMPRESSION
PLASMA CONDUCTIVITY
PLASMA CONTROL
PLASMA COOLING
PLASMA CORE REACTORS
PLASMA CURRENTS
PLASMA CYLINDERS

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PLASMA DECAY  
 PLASMA DENSITY  
 PLASMA DIAGNOSTICS  
 PLASMA DIFFUSION  
 PLASMA DIODES  
 PLASMA DISPLAY DEVICES  
 PLASMA DRIFT  
 PLASMA DYNAMICS  
 PLASMA ENGINES  
 PLASMA EQUILIBRIUM  
 PLASMA ETCHING  
 PLASMA FLUX MEASUREMENT  
 PLASMA FREQUENCIES  
 PLASMA GENERATORS  
 PLASMA GUNS  
 PLASMA HEATING  
 PLASMA INTERACTION EXPERIMENT  
 PLASMA INTERACTIONS  
 PLASMA JET SYNTHESIS  
 PLASMA JET WIND TUNNELS  
 PLASMA JETS  
 PLASMA LAYERS  
 PLASMA LIFETIME  
 PLASMA LOSS  
 PLASMA OSCILLATIONS  
 PLASMA PHYSICS  
 PLASMA PINCH  
 PLASMA POTENTIALS  
 PLASMA POWER SOURCES  
 PLASMA PRESSURE  
 PLASMA PROBES  
 PLASMA PROPULSION  
 PLASMA PUMPING  
 PLASMA RADIATION  
 PLASMA RESONANCE  
 PLASMA SHEATHS  
 PLASMA SLABS  
 PLASMA SPECTRA  
 PLASMA SPRAYING  
 PLASMA TEMPERATURE  
 PLASMA TORCHES  
 PLASMA TURBULENCE  
 PLASMA WAVES  
 PLASMA-ELECTROMAGNETIC INTERACTION  
 PLASMA-PARTICLE INTERACTIONS  
 PLASMADYNAMIC LASERS  
 PLASMAGUIDES  
 PLASMAPAUSE  
 PLASMASPHERE  
 PLASMATRONS  
 RADIATION BELTS  
 RAREFIED GAS DYNAMICS  
 SCYLLA  
 SOLAR PHYSICS  
 SPACE CHARGE

SPHINX  
 STELLAR MAGNETIC FIELDS  
 TEARING MODES (PLASMAS)  
 THERMAL DISSOCIATION  
 THERMODYNAMICS  
 THERMONUCLEAR REACTIONS  
 TWO STAGE PLASMA ENGINES

PLASMA-IN-SPACE PAYLOAD  
 USE AMPS (SATELLITE PAYLOAD)

PLASMASPHERE  
 1301 3009  
 RT ATMOSPHERIC IONIZATION  
 CHEMOSPHERE  
 EARTH ATMOSPHERE  
 EARTH MAGNETOSPHERE  
 OPEN PROJECT  
 PLASMAS (PHYSICS)  
 UPPER ATMOSPHERE

PLASMATRONS  
 0905 1203 2501  
 GS ION SOURCES  
 #PLASMATRONS  
 ..DUOPLASMATRONS  
 PLASMA GENERATORS  
 #PLASMATRONS  
 ..DUOPLASMATRONS  
 PLASMA ELECTRODES  
 PLASMA GUNS  
 PLASMA JETS  
 PLASMA PROPULSION  
 PLASMAS (PHYSICS)

PLASMOIDS  
 USE PLASMAS (PHYSICS)

PLASMOLYSIS  
 0404 0406  
 RT CELLS (BIOLOGY)  
 CYTOLOGY  
 DEHYDRATION

PLASMONS  
 1002 2403 2502 0705  
 SN (EXCLUDES ORGANIC CYTOPLASMIC CONDITIONS)  
 GS ELECTROMAGNETIC RADIATION  
 #PLASMONS  
 ELEMENTARY EXCITATIONS  
 #PLASMONS  
 POLARITONS  
 #PLASMONS  
 RT ELECTRON GAS

EXCITONS  
 MAGNETOHYDRODYNAMIC STABILITY  
 MAGNONS  
 PHONONS  
 PLASMA FREQUENCIES  
 PLASMA OSCILLATIONS  
 POLARONS

PLASTERS  
 1802 1805  
 GS #PLASTERS  
 .GYPSUM  
 .PARAPLASTS  
 RT CASTS  
 GROUT  
 MOLDING MATERIALS  
 MORTARS (MATERIAL)  
 PASTES

PLASTIC AIRCRAFT STRUCTURES  
 0102 0202 1809  
 GS AIRCRAFT STRUCTURES  
 #PLASTIC AIRCRAFT STRUCTURES  
 RT AIRCRAFT CONSTRUCTION MATERIALS  
 AIRCRAFT SURVIVABILITY  
 BORON-EPOXY COMPOSITES  
 GLASS FIBER REINFORCED PLASTICS  
 PLASTICS

PLASTIC ANISOTROPY  
 1704 1809 2603  
 GS ANISOTROPY  
 #PLASTIC ANISOTROPY  
 ..ELASTIC ANISOTROPY  
 RT VISCOPLASTICITY

PLASTIC BODIES  
 1809 3202 3203 0102  
 RT BEAMS (SUPPORTS)  
 % BODIES  
 CYLINDRICAL BODIES  
 ELASTIC BODIES  
 ELASTIC PLATES  
 ELASTOPLASTICITY  
 PLASTIC PROPERTIES  
 PLASTIC SHELLS  
 RIGID STRUCTURES

PLASTIC COATINGS  
 1702 1802 1809  
 GS COATINGS  
 #PLASTIC COATINGS  
 RT ANTIRADAR COATINGS  
 ENCAPSULATING  
 POLYMERIC FILMS

# NASA THESAURUS HIERARCHICAL UPDATE

|                             |                                  |                              |
|-----------------------------|----------------------------------|------------------------------|
| PROTECTIVE COATINGS         | VISCOPLASTICITY                  | RHEOLOGY                     |
| SPRAYED COATINGS            |                                  | SEMISOLIDS                   |
|                             | PLASTIC MEMORY                   | STRESS RELAXATION            |
| PLASTIC DEFORMATION         | 0604 2603                        | STRESS TENSORS               |
| 1108 1703 2311 3204 3501    | RT                               | STRUCTURAL STABILITY         |
| UF                          | SHAPE MEMORY ALLOYS              |                              |
| LUDER BANDS                 | STRESS RELAXATION                |                              |
| PLASTIC YIELDING            |                                  |                              |
| STRAIN SOFTENING            |                                  |                              |
| DEFORMATION                 | PLASTIC PLATES                   | PLASTIC SHELLS               |
| #PLASTIC DEFORMATION        | 1809 3203                        | 1504 1809 3202 3203          |
| RT % BANDS                  | SN (STRUCTURAL PLATES EXHIBITING | GS SHELLS (STRUCTURAL FORMS) |
| BENDING                     | PLASTIC PROPERTIES)              |                              |
| BORDONI PEAKS               | GS STRUCTURAL MEMBERS            | RT CYLINDRICAL SHELLS        |
| CREEP PROPERTIES            | .PLATES (STRUCTURAL MEMBERS)     | ELASTIC SHELLS               |
| CREEP TESTS                 | .#PLASTIC PLATES                 | ELASTOPLASTICITY             |
| DUCTILE-BRITTLE TRANSITION  | RT ELASTIC PLATES                | PLASTIC BODIES               |
| ELASTIC DEFORMATION         | ELASTOPLASTICITY                 | REINFORCED SHELLS            |
| ELONGATION                  | REINFORCED PLATES                | SHELL STABILITY              |
| J INTEGRAL                  |                                  |                              |
| PLANE STRAIN                | PLASTIC PROPELLANTS              | PLASTIC TAPES                |
| SAINT VENANT PRINCIPLE      | 1808 1809 2702 2808 2809         | 0701 0802 1809               |
| SHEAR CREEP                 | GS PROPELLANTS                   | RT ADHESIVES                 |
| % SLIP                      | .SOLID PROPELLANTS               | MAGNETIC TAPES               |
| STRAIN DISTRIBUTION         | .#PLASTIC PROPELLANTS            | % TAPES                      |
| STRESS PROPAGATION          | RT CHEMICAL FUELS                |                              |
| STRESS RELAXATION           | COMPOSITE PROPELLANTS            | PLASTIC YIELDING             |
| STRESS-STRAIN RELATIONSHIPS | EXPLOSIVES                       | USE PLASTIC DEFORMATION      |
| STRETCHING                  | GELLED PROPELLANTS               |                              |
| STRUCTURAL STRAIN           | HTPB PROPELLANTS                 | PLASTICITY                   |
| SUPERPLASTICITY             | MONOPROPELLANTS                  | USE PLASTIC PROPERTIES       |
| TEMPERATURE INVERSIONS      | PLASTICIZERS                     |                              |
| TENSILE CREEP               | POLYBUTADIENE TETRANITRAMINE     | PLASTICIZERS                 |
| TENSILE DEFORMATION         | PYROTECHNICS                     | 1808 1809 1810               |
| THERMOMECHANICAL TREATMENT  |                                  | UF CASTING SOLVENTS          |
| WARPAGE                     | PLASTIC PROPERTIES               | ELASTICIZERS                 |
| WORK SOFTENING              | 1809 2603 3202 3204              | GS ADDITIVES                 |
| YIELD STRENGTH              | UF PLASTICITY                    | #PLASTICIZERS                |
|                             | GS MECHANICAL PROPERTIES         | RT CASE BONDED PROPELLANTS   |
|                             | #PLASTIC PROPERTIES              | COATINGS                     |
|                             | ..ELASTOPLASTICITY               | DOMINO PROPELLANTS           |
|                             | ..PHOTOPLASTICITY                | ESTERS                       |
|                             | ..SUPERPLASTICITY                | PLASTIC PROPELLANTS          |
|                             | ..THERMOPLASTICITY               | PROPELLANT ADDITIVES         |
|                             | ..VISCOPLASTICITY                | SKYDROL (TRADEMARK)          |
|                             | ..YIELD POINT                    | SOLID PROPELLANTS            |
|                             | RT COHESION                      | SOLID ROCKET BINDERS         |
|                             | COLD FLOW TESTS                  | SURFACTANTS                  |
|                             | DUCTILITY                        | TRIACETIN                    |
|                             | ELASTIC PROPERTIES               |                              |
|                             | FATIGUE (MATERIALS)              | PLASTICS                     |
|                             | FLEXIBILITY                      | 1804 1808 1809               |
|                             | HARDNESS                         | GS #PLASTICS                 |
|                             | INFLUENCE COEFFICIENT            | .DELFIN (TRADEMARK)          |
|                             | METHOD OF CHARACTERISTICS        | .PERSPEX (TRADEMARK)         |
|                             | PLASTIC BODIES                   | .POLYBUTADIENE               |
|                             | % PROPERTIES                     | .POLYETHYLENES               |
|                             |                                  | ..POLYETHYLENE TEREPHTHALATE |

|                                    |               |                                     |      |      |          |                                 |
|------------------------------------|---------------|-------------------------------------|------|------|----------|---------------------------------|
| .POLYISOBUTYLENE                   | 1804          | 1808                                | 1809 | 1810 | PLATEAUS | PLATES                          |
| .POLYPROPYLENE                     | GS            | MIXTURES                            |      |      | 1504     |                                 |
| .POLYSTYRENE                       |               | .DISPERSIONS                        |      |      | RT %     | PLATES                          |
| ..STYROFOAM (TRADEMARK)            |               | ..PLASTISOLS                        |      |      |          | RT %                            |
| .POLYTETRAFLUOROETHYLENE           |               | ...SMOKE                            |      |      |          | PLATES                          |
| ..TEFLON (TRADEMARK)               | RT            | COLLOIDS                            |      |      | %        | PRESSING                        |
| .POLYVINYL ALCOHOL                 |               | COMPOSITE PROPELLANTS               |      |      |          | PUNCHES                         |
| .POLYVINYL CHLORIDE                |               | DOUBLE BASE PROPELLANTS             |      |      |          | RAMS (PRESSES)                  |
| .POLYVINYL FLUORIDE                |               | RESINS                              |      |      |          | ROLLERS                         |
| .REINFORCED PLASTICS               |               |                                     |      |      |          | TOOLS                           |
| ..CARBON FIBER REINFORCED PLASTICS | PLAT SYSTEM   |                                     |      |      | %        | PLATES                          |
| ..GLASS FIBER REINFORCED PLASTICS  | O202          | O203                                | 0701 | 0705 | 1101     | 2101                            |
| ..MICARTA                          | UF            | PILOT LANDING AID TELEVISION SYSTEM |      |      |          |                                 |
| .SYNTHETIC RESINS                  | GS            | COMMUNICATION EQUIPMENT             |      |      |          | O903                            |
| ..ADDITION RESINS                  |               | #PLAT SYSTEM                        |      |      |          | O905                            |
| ...ACRYLIC RESINS                  |               | TELECOMMUNICATION                   |      |      |          | 3203                            |
| ...VINYL COPOLYMERS                |               | #PLAT SYSTEM                        |      |      |          | SN                              |
| ..POLYESTER RESINS                 |               | TELEVISION SYSTEMS                  |      |      |          | (USE OF A MORE SPECIFIC TERM IS |
| ..POLYETHER RESINS                 |               | #PLAT SYSTEM                        |      |      |          | RECOMMENDED--CONSULT THE TERMS  |
| ...PEEK                            | RT            | LANDING AIDS                        |      |      |          | LISTED BELOW)                   |
| ...POLYMETHYL METHACRYLATE         |               | % SYSTEMS                           |      |      |          | CORRUGATING                     |
| ..THERMOPLASTIC RESINS             |               |                                     |      |      |          | DISKS (SHAPES)                  |
| ...PEEK                            |               |                                     |      |      |          | FLAT PLATES                     |
| ...QUINOXALINES                    | PLATE (METAL) |                                     |      |      |          | METAL COATINGS                  |
| ..THERMOPLASTIC FILMS              | USE           | METAL PLATES                        |      |      |          | METAL PLATES                    |
| ..THERMOSETTING RESINS             |               |                                     |      |      |          | MICROCHANNEL PLATES             |
| ...EPOXY RESINS                    | PLATE THEORY  |                                     |      |      |          | PANELS                          |
| ...PHENOLIC EPOXY RESINS           | 3203          |                                     |      |      |          | PARALLEL PLATES                 |
| ...FURAN RESINS                    | RT            | FLAT PLATES                         |      |      |          | PHOTOGRAPHIC PLATES             |
| ...POLYAMIDE RESINS                |               | STRUCTURAL ANALYSIS                 |      |      |          | PLATEAUS                        |
| ...KEVLAR (TRADEMARK)              | %             | THEORIES                            |      |      |          | PLATES (STRUCTURAL MEMBERS)     |
| ...PHENOLIC RESINS                 | PLATEAUS      |                                     |      |      |          | PLATING                         |
| ...MICARTA                         | 1305          | 1902                                | 3406 |      |          | RECTANGULAR PLATES              |
| ...PHENOLIC EPOXY RESINS           | GS            | LANDFORMS                           |      |      |          | SCATTER PLATES (OPTICS)         |
| ACRYLONITRILES                     |               | .TERRACES (LANDFORMS)               |      |      |          | THICK PLATES                    |
| ARAMID FIBERS                      |               | ..PLATEAUS                          |      |      |          | THIN PLATES                     |
| BORON REINFORCED MATERIALS         |               | ...ALLEGHENY PLATEAU (US)           |      |      |          | TRAYS                           |
| % CONSTRUCTION MATERIALS           |               | ...COLORADO PLATEAU (US)            |      |      |          |                                 |
| ELASTOMERS                         |               | ...MESAS                            |      |      |          |                                 |
| FLUOROPOLYMERS                     |               | ...BUTTES                           |      |      |          |                                 |
| FURANS                             |               | ...PIEDMONTS                        |      |      |          |                                 |
| INJECTION MOLDING                  |               | ...CENTRAL PIEDMONT (US)            |      |      |          |                                 |
| ION EXCHANGE RESINS                | RT            | APEXES                              |      |      |          |                                 |
| KAPTON (TRADEMARK)                 |               | EROSION                             |      |      |          |                                 |
| % MATERIALS SCIENCE                |               | HIGHLANDS                           |      |      |          |                                 |
| MOLDING MATERIALS                  |               | % PEAKS                             |      |      |          |                                 |
| ORGANIC MATERIALS                  |               | PLAINS                              |      |      |          |                                 |
| PETROLEUM PRODUCTS                 |               | STRATIGRAPHY                        |      |      |          |                                 |
| PLASTIC AIRCRAFT STRUCTURES        |               |                                     |      |      |          |                                 |
| % POLYMERS                         | PLATELETS     |                                     |      |      |          |                                 |
| SHEET MOLDING COMPOUNDS            | O404          | O406                                |      |      |          |                                 |
| TETRAHYDROFURAN                    | RT            | BLOOD COAGULATION                   |      |      |          |                                 |
| THIOPLASTICS                       |               | BLOOD GROUPS                        |      |      |          |                                 |
|                                    |               | HISTOLOGY                           |      |      |          |                                 |
|                                    |               | THROMBOPLASTIN                      |      |      |          |                                 |
| PLASTISOLS                         |               |                                     |      |      |          |                                 |



# NASA THESAURUS HIERARCHICAL UPDATE

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GIRDERS
METAL SHEETS
ORTHOTROPISM
% PLATES
REISSNER THEORY
SLABS
THICK PLATES
THIN PLATES

PLATES (TECTONICS)
1306
RT
EARTH CRUST
EARTH MANTLE
EARTH PLANETARY STRUCTURE
EARTHQUAKES
GEOLOGICAL FAULTS
GEOPHYSICS
LITHOSPHERE
SEA FLOOR SPREADING
STRUCTURAL PROPERTIES (GEOLOGY)
SUBDUCTION (GEOLOGY)
TECTONICS

% PLATFORMS
O203 1403 3109 3203
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT
FLIGHT MECHANICS
FLOORS
FLYING PLATFORMS
GUIDANCE (MOTION)
INERTIAL PLATFORMS
LANDFORMS
LAUNCHING PADS
OFFSHORE PLATFORMS
SLABS
SOLETTAS
SPACE PLATFORMS
SPACE STATIONS
STABILIZED PLATFORMS
SUPPORTS
SYNCHRONOUS PLATFORMS

PLATING
O604 1702 1704
GS #PLATING
.ELECTROPLATING
.FLAME PLATING
.ION PLATING
.NICKEL PLATE
RT
ANODIC STRIPPING
CATHODIC COATINGS
CLADDING
DEPOSITION

DEPOSITS
ELECTRODEPOSITION
ELECTROLESS DEPOSITION
FINISHES
LAMINATES
METAL COATINGS
METAL FINISHING
METALLIZING
% PLATES
PROTECTIVE COATINGS
SUBSTRATES
THIN FILMS

PLATINUM
1703
GS
CHEMICAL ELEMENTS
#PLATINUM
..PLATINUM ISOTOPES
METALS
.TRANSITION METALS
.#PLATINUM
...PLATINUM ISOTOPES
RT PLATINUM BLACK

PLATINUM ALLOYS
1701 1703
GS ALLOYS
#PLATINUM ALLOYS
RT IRIIDIUM ALLOYS
RHODIUM ALLOYS

PLATINUM BLACK
O603 1703 1704
GS
PARTICLES
.METAL PARTICLES
..METAL POWDER
..#PLATINUM BLACK
.POWDER (PARTICLES)
..METAL POWDER
..#PLATINUM BLACK
RT CATALYSTS
PLATINUM

PLATINUM COMPOUNDS
O603 1804
GS #PLATINUM COMPOUNDS
.PLATINUM OXIDES
RT % CHEMICAL COMPOUNDS
% GROUP 8 COMPOUNDS
% METAL COMPOUNDS

PLATINUM ISOTOPES
O603 1703 2406
GS
CHEMICAL ELEMENTS
.NUCLIDES

..ISOTOPES
..#PLATINUM ISOTOPES
.PLATINUM
.#PLATINUM ISOTOPES
METALS
.TRANSITION METALS
..PLATINUM
..#PLATINUM ISOTOPES

PLATINUM OXIDES
O603 1804
GS CHALCOGENIDES
.OXIDES
..METAL OXIDES
..#PLATINUM OXIDES
PLATINUM COMPOUNDS
#PLATINUM OXIDES

PLAYAS
1306
GS LAND
.PLAINS
.#PLAYAS
LANDFORMS
#PLAYAS
RT DESERTS
LAKES

PLAYBACKS
O702 1402 1410 9001
RT MAGNETIC TAPES
% RECORDERS
RECORDING
RECORDS
% TAPES
VIDEO DISKS

PLEIADES CLUSTER
3001 3003
GS CELESTIAL BODIES
.STAR CLUSTERS
..OPEN CLUSTERS
..#PLEIADES CLUSTER
RT % CLUSTERS
TAURUS CONSTELLATION

PLENUM CHAMBERS
O209 0303 1203 3301
RT AIR INTAKES
% CHAMBERS
DUCTS
EXHAUST SYSTEMS
FUEL SYSTEMS
INTAKE SYSTEMS
MANIFOLDS

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|  |                                                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                              |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | % WATER INTAKES                                                                                                                                                                                           |  | POSITION INDICATORS<br>PRINTERS<br>REMOTE CONSOLES                                                                                                                                                                                                                                                         |  | PLUGGING<br>1501<br>UF<br>RT                                                                                                                                                                                                                                 |
|  | PLETHYSMOGRAPHY<br>O402 O404 O405 O408 O501 O905<br>GS BIOENGINEERING<br>.BIOMETRICS<br>. #PLETHYSMOGRAPHY<br>...ELECTROPLETHYSMOGRAPHY                                                                   |  | PLOTTING<br>O705 O803 1504 2103<br>RT ANALOG TO DIGITAL CONVERTERS<br>DISPLAY DEVICES<br>NAVIGATION<br>% PLOTS<br>PLOTTERS<br>PRINTING<br>RECORDING                                                                                                                                                        |  | CLOGGING<br>AGGLOMERATION<br>BLOCKING<br>CAULKING<br>CLOSING<br>CLOSURES<br>CONSTRICTIONS<br>FOULING<br>PLUGS<br>SEALING<br>SEALS (STOPPERS)                                                                                                                 |
|  | PLEURAE<br>O402 O404 O405<br>GS ANATOMY<br>#PLEURAE<br>MEMBRANES<br>#PLEURAE<br>RT LUNGS<br>RESPIRATORY SYSTEM                                                                                            |  | PLOTTING INSTRUMENTS<br>USE PLOTTERS<br><br>PLOWED FIELDS<br>USE FARMLANDS<br><br>PLOWING<br>O404 O409<br>GS CULTIVATION<br>#PLOWING<br>RT AGRICULTURE<br>FARM CROPS<br>FARMLANDS<br>GRASSLANDS<br>PLANTING<br>PLANTS (BOTANY)<br>PLOTS<br>SOD<br>TRACTORS                                                 |  | PLUGS<br>1406 3201<br>SN (EXCLUDES SPARKPLUGS OR ELECTRICAL CONNECTORS)<br>GS SEALS (STOPPERS)<br>#PLUGS<br>RT BLOCKING<br>CLOSURES<br>LABYRINTH SEALS<br>OUTLETS<br>PLUGGING<br>STOPPING                                                                    |
|  | PLEXIGLASS (TRADEMARK)<br>USE POLYMETHYL METHACRYLATE                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                            |  | PLUM BROOK REACTOR<br>2204<br>GS NUCLEAR REACTORS<br>. LIQUID COOLED REACTORS<br>. .WATER COOLED REACTORS<br>. .#PLUM BROOK REACTOR<br>.NUCLEAR RESEARCH AND TEST REACTORS<br>. #PLUM BROOK REACTOR                                                          |
|  | PLIES<br>USE LAYERS<br><br>% PLOTS<br>O803 2103<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT CHARTS<br>DISPLAY DEVICES<br>PLOTTERS<br>PLOTTING<br>SITES |  | PLOTS<br>O505 1504<br>RT AGRICULTURE<br>MIXERS<br>PLANTING<br>PLOWING<br><br>PLSS<br>USE PORTABLE LIFE SUPPORT SYSTEMS<br><br>PLUG NOZZLES<br>2804 2806<br>GS EXHAUST NOZZLES<br>#PLUG NOZZLES<br>RT ANNULAR NOZZLES<br>CONICAL NOZZLES<br>NOZZLE GEOMETRY<br>% NOZZLES<br>ROCKET NOZZLES<br>SPIKE NOZZLES |  | PLUMBAGE<br>O402<br>RT BIRDS<br><br>PLUMBANE<br>USE LEAD COMPOUNDS<br>METAL HYDRIDES<br><br>PLUMES<br>2702 2805 2808 3303 3501<br>GS #PLUMES<br>. ROCKET EXHAUST<br>RT CHIMNEYS<br>CONDENSATES<br>POLLUTION TRANSPORT<br>SHOCK WAVES<br><br>PLUNGERS<br>1504 |

# NASA THESAURUS HIERARCHICAL UPDATE

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RT MIXERS
PISTONS
RAMS (PRESSES)
RAMS (PUMPS)

PLUTO (PLANET)
3001 3008
GS CELESTIAL BODIES
.PLANETS
.#PLUTO (PLANET)
RT CHARON
PLUTO ATMOSPHERE

PLUTO ATMOSPHERE
3001 3008
GS ENVIRONMENTS
.EXTRATERRESTRIAL ENVIRONMENTS
...PLANETARY ENVIRONMENTS
...PLANETARY ATMOSPHERES
...#PLUTO ATMOSPHERE
RT PLUTO (PLANET)

PLUTO REACTORS
0204 2202 2204 2805 3401
GS NUCLEAR REACTORS
#PLUTO REACTORS
RT NUCLEAR RAMJET ENGINES
NUCLEAR ROCKET ENGINES
SUPERSONIC LOW ALTITUDE MISSILE

PLUTONIUM
1703 2203 2406
GS CHEMICAL ELEMENTS
.ACTINIDE SERIES
...TRANSURANIUM ELEMENTS
...#PLUTONIUM
....PLUTONIUM ISOTOPES
....PLUTONIUM 238
....PLUTONIUM 239
....PLUTONIUM 240
....PLUTONIUM 241
....PLUTONIUM 244
.NUCLIDES
.ISOTOPES
...RADIOACTIVE ISOTOPES
...TRANSURANIUM ELEMENTS
...#PLUTONIUM
....PLUTONIUM ISOTOPES
....PLUTONIUM 238
....PLUTONIUM 239
....PLUTONIUM 240
....PLUTONIUM 241
....PLUTONIUM 244
METALS
.ACTINIDE SERIES

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...TRANSURANIUM ELEMENTS
...#PLUTONIUM
....PLUTONIUM ISOTOPES
....PLUTONIUM 238
....PLUTONIUM 239
....PLUTONIUM 240
....PLUTONIUM 241
....PLUTONIUM 244
.FISSIONABLE MATERIALS
NUCLEAR FUELS
RT
PLUTONIUM ALLOYS
1701 2203
GS ALLOYS
#PLUTONIUM ALLOYS
RT NUCLEAR FUEL ELEMENTS
NUCLEAR FUELS
PLUTONIUM CARBIDES
USE PLUTONIUM COMPOUNDS
PLUTONIUM COMPOUNDS
0603 1804 2203
UF PLUTONIUM CARBIDES
GS ACTINIDE SERIES COMPOUNDS
#PLUTONIUM COMPOUNDS
..PLUTONIUM FLUORIDES
..PLUTONIUM OXIDES
..PLUTONIUM OXIDES
RT CERAMIC NUCLEAR FUELS
% CHEMICAL COMPOUNDS
% METAL COMPOUNDS
% NUCLEAR FUELS
PLUTONIUM FLUORIDES
0603 1804
GS ACTINIDE SERIES COMPOUNDS
..PLUTONIUM COMPOUNDS
..PLUTONIUM FLUORIDES
HALOGEN COMPOUNDS
..FLUORINE COMPOUNDS
..FLUORIDES
...METAL FLUORIDES
...#PLUTONIUM FLUORIDES
PLUTONIUM ISOTOPES
2406
GS CHEMICAL ELEMENTS
.ACTINIDE SERIES
...TRANSURANIUM ELEMENTS
...#PLUTONIUM
....PLUTONIUM ISOTOPES
....PLUTONIUM 238
....PLUTONIUM 239
....PLUTONIUM 240
....PLUTONIUM 241
....PLUTONIUM 244

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....PLUTONIUM 244
.NUCLIDES
.ISOTOPES
...RADIOACTIVE ISOTOPES
...TRANSURANIUM ELEMENTS
...#PLUTONIUM
....PLUTONIUM ISOTOPES
....PLUTONIUM 238
....PLUTONIUM 239
....PLUTONIUM 240
....PLUTONIUM 241
....PLUTONIUM 244
METALS
.ACTINIDE SERIES
...TRANSURANIUM ELEMENTS
...#PLUTONIUM
....PLUTONIUM ISOTOPES
....PLUTONIUM 238
....PLUTONIUM 239
....PLUTONIUM 240
....PLUTONIUM 241
....PLUTONIUM 244
PLUTONIUM OXIDES
0603 1804 2203
GS ACTINIDE SERIES COMPOUNDS
..PLUTONIUM COMPOUNDS
..PLUTONIUM OXIDES
CHALCOGENIDES
.OXIDES
..METAL OXIDES
..#PLUTONIUM OXIDES
RT CERAMIC NUCLEAR FUELS
MIXED OXIDES
PLUTONIUM RECYCLE TEST REACTOR
1108 2204
UF PRTR (REACTOR)
GS NUCLEAR ELECTRIC POWER GENERATION
.NUCLEAR POWER REACTORS
.#PLUTONIUM RECYCLE TEST REACTOR
NUCLEAR REACTORS
.LIQUID COOLED REACTORS
..WATER COOLED REACTORS
...HEAVY WATER REACTORS
...#PLUTONIUM RECYCLE TEST REACTOR
.NUCLEAR POWER REACTORS
.#PLUTONIUM RECYCLE TEST REACTOR
.NUCLEAR RESEARCH AND TEST REACTORS
.#PLUTONIUM RECYCLE TEST REACTOR
.WATER MODERATED REACTORS
.#PLUTONIUM RECYCLE TEST REACTOR
PLUTONIUM 238
1703 2203 2406

```

| Category                  | Item                      | Value |
|---------------------------|---------------------------|-------|
| GS                        | CHEMICAL ELEMENTS         |       |
|                           | .ACTINIDE SERIES          |       |
|                           | ..TRANSURANIUM ELEMENTS   |       |
|                           | ...PLUTONIUM              |       |
|                           | ....PLUTONIUM ISOTOPES    |       |
|                           | .....#PLUTONIUM 238       |       |
|                           | ..NUCLIDES                |       |
|                           | ..ISOTOPES                |       |
|                           | ...RADIOACTIVE ISOTOPES   |       |
|                           | ....TRANSURANIUM ELEMENTS |       |
| .....PLUTONIUM            |                           |       |
| .....#PLUTONIUM 238       |                           |       |
| METALS                    |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 238       |                           |       |
| PLUTONIUM 239             |                           |       |
| 1703 2203 2406            |                           |       |
| GS                        |                           |       |
| CHEMICAL ELEMENTS         |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 239       |                           |       |
| ..NUCLIDES                |                           |       |
| ..ISOTOPES                |                           |       |
| ...RADIOACTIVE ISOTOPES   |                           |       |
| ....TRANSURANIUM ELEMENTS |                           |       |
| .....PLUTONIUM            |                           |       |
| .....#PLUTONIUM 239       |                           |       |
| METALS                    |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 239       |                           |       |
| PLUTONIUM 240             |                           |       |
| 1703 2203 2406            |                           |       |
| GS                        |                           |       |
| CHEMICAL ELEMENTS         |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 240       |                           |       |
| ..NUCLIDES                |                           |       |
| ..ISOTOPES                |                           |       |
| ...RADIOACTIVE ISOTOPES   |                           |       |
| ....TRANSURANIUM ELEMENTS |                           |       |
| .....PLUTONIUM            |                           |       |
| .....#PLUTONIUM 240       |                           |       |
| PLUTONIUM 241             |                           |       |
| 1703 2406                 |                           |       |
| GS                        |                           |       |
| CHEMICAL ELEMENTS         |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 241       |                           |       |
| ..NUCLIDES                |                           |       |
| ..ISOTOPES                |                           |       |
| ...RADIOACTIVE ISOTOPES   |                           |       |
| ....TRANSURANIUM ELEMENTS |                           |       |
| .....PLUTONIUM            |                           |       |
| .....#PLUTONIUM 241       |                           |       |
| METALS                    |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 241       |                           |       |
| PLUTONIUM 244             |                           |       |
| 2406                      |                           |       |
| GS                        |                           |       |
| CHEMICAL ELEMENTS         |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 244       |                           |       |
| ..NUCLIDES                |                           |       |
| ..ISOTOPES                |                           |       |
| ...RADIOACTIVE ISOTOPES   |                           |       |
| ....TRANSURANIUM ELEMENTS |                           |       |
| .....PLUTONIUM            |                           |       |
| .....#PLUTONIUM 244       |                           |       |
| METALS                    |                           |       |
| .ACTINIDE SERIES          |                           |       |
| ..TRANSURANIUM ELEMENTS   |                           |       |
| ...PLUTONIUM              |                           |       |
| ....PLUTONIUM ISOTOPES    |                           |       |
| .....#PLUTONIUM 244       |                           |       |
| PLUVIOGRAPHS              |                           |       |
| USE                       |                           |       |
| RAIN GAGES                |                           |       |
| RECORDING INSTRUMENTS     |                           |       |
| PLY ORIENTATION           |                           |       |
| 1504                      |                           |       |
| RT                        |                           |       |
| ALIGNMENT                 |                           |       |
| COMPOSITE MATERIALS       |                           |       |
| INTERLAYERS               |                           |       |
| LAMINATES                 |                           |       |
| % LAYERS                  |                           |       |
| MULTILAYER INSULATION     |                           |       |
| % ORIENTATION             |                           |       |
| PLYWOOD                   |                           |       |
| POSITIONING               |                           |       |
| SANDWICH STRUCTURES       |                           |       |
| SUBSTRATES                |                           |       |
| PLYWOOD                   |                           |       |
| 1805                      |                           |       |
| GS                        |                           |       |
| COMPOSITE MATERIALS       |                           |       |
| .LAMINATES                |                           |       |
| ..PLYWOOD                 |                           |       |
| COMPOSITE STRUCTURES      |                           |       |
| .LAMINATES                |                           |       |
| ..PLYWOOD                 |                           |       |
| WOOD                      |                           |       |
| #PLYWOOD                  |                           |       |
| RT                        |                           |       |
| PLY ORIENTATION           |                           |       |
| TREES (PLANTS)            |                           |       |
| WOODEN STRUCTURES         |                           |       |
| PNEUMATIC CIRCUITS        |                           |       |
| 0303 1201 1203 2204 3501  |                           |       |
| GS                        |                           |       |
| CIRCUITS                  |                           |       |
| #PNEUMATIC CIRCUITS       |                           |       |
| PNEUMATIC EQUIPMENT       |                           |       |
| #PNEUMATIC CIRCUITS       |                           |       |
| RT                        |                           |       |
| FLUIDICS                  |                           |       |
| VALVES                    |                           |       |
| PNEUMATIC CONTROL         |                           |       |
| 0303 1203 2204 3501       |                           |       |
| UF                        |                           |       |
| PNEUMATIC RESET           |                           |       |
| RT                        |                           |       |
| AUTOMATIC CONTROL         |                           |       |
| AUTOMATIC CONTROL VALVES  |                           |       |
| COMPRESSED GAS            |                           |       |
| % CONTROL                 |                           |       |
| CONTROL EQUIPMENT         |                           |       |
| CONTROL VALVES            |                           |       |
| CONTROLLERS               |                           |       |
| ELECTRONIC CONTROL        |                           |       |
| ENGINE CONTROL            |                           |       |
| FLUID POWER               |                           |       |
| FLUIDICS                  |                           |       |
| HYDRAULIC CONTROL         |                           |       |
| REMOTE CONTROL            |                           |       |

# NASA THESAURUS HIERARCHICAL UPDATE

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PNEUMATIC EQUIPMENT
O303 1201 1203 2204 3501
GS #PNEUMATIC EQUIPMENT
  .GAS VALVES
  .PNEUMATIC CIRCUITS
  .PNEUMATIC PROBES
RT AIR BAG RESTRAINT DEVICES
  COMPRESSED AIR
  CUSHIONS
  % EQUIPMENT
  FLUID AMPLIFIERS
  FLUID POWER
  FLUID SWITCHING ELEMENTS
  FLUIDICS
  GAS GENERATORS
  GOLAY DETECTOR CELLS
  INFLATABLE STRUCTURES
  % NETWORKS
  SERVOCONTROL
  SERVOMECHANISMS
  SHOCK ABSORBERS
  % SYSTEMS
  VALVES

PNEUMATIC PROBES
1203 1408 3108 3303 3501
GS MEASURING INSTRUMENTS
  .TEMPERATURE MEASURING INSTRUMENTS
  .#PNEUMATIC PROBES
  PNEUMATIC EQUIPMENT
  #PNEUMATIC PROBES
RT FLOW MEASUREMENT
  HIGH TEMPERATURE GASES
  MASS FLOW RATE
  NOZZLE FLOW
  PRESSURE MEASUREMENT

PNEUMATIC RESET
USE PNEUMATIC CONTROL

PNEUMATICS
1201 1202 1203
GS FLUID MECHANICS
  #PNEUMATICS
RT FLOW THEORY
  FLUID POWER
  FLUIDICS
  GASES
  % HYDRAULICS

PNEUMOGRAPHS
USE PNEUMOGRAPHY

PNEUMOGRAPHY

O404 O408 O501
UF PNEUMOGRAPHS
RT BIOTELEMETRY
  LUNGS
  % MEASUREMENT
  RADIOGRAPHY

PNEUMONIA
O405 O412
GS DISEASES
  .RESPIRATORY DISEASES
  .#PNEUMONIA
RT ACQUIRED IMMUNODEFICIENCY SYNDROME
  BACTERIAL DISEASES
  CONGESTION
  VIRAL DISEASES

PNEUMOTHORAX
O404
RT DISEASES
  LUNGS
  MEDICAL SCIENCE

PNICTIDES
USE GROUP 5A COMPOUNDS

POCKELS EFFECT
USE BIREFRINGENCE

POCKET MICE
O402 O405 O411
GS ANIMALS
  .VERTEBRATES
  .MAMMALS
  .RODENTS
  .MICE
  .#POCKET MICE
RT RATS

PODS (EXTERNAL STORES)
1504 2801
GS EXTERNAL STORES
  #PODS (EXTERNAL STORES)
RT COWLINGS
  EXTERNAL STORE SEPARATION
  FUEL TANKS
  NACELLES
  WING-FUSELAGE STORES

POGO
1308 3107
UF POLAR ORBIT GEOPHYSICAL OBSERVATORY
GS ARTIFICIAL SATELLITES
  .GEOPHYSICAL SATELLITES
  .OGO

POHLHAUSEN METHOD
O101 O102 1202 1203 3303 3501
UF POHLHAUSEN SOLUTION
GS ANALYSIS (MATHEMATICS)
  .NUMERICAL ANALYSIS
  .APPROXIMATION
  .#POHLHAUSEN METHOD
RT LAMINAR BOUNDARY LAYER
  % METHODOLOGY
  VELOCITY DISTRIBUTION
  VISCOUS FLOW

POHLHAUSEN SOLUTION
USE POHLHAUSEN METHOD

POIKILOthermia
O402 O404
UF COLD BLOODED ANIMALS
GS ANIMALS
  #POIKILOthermia
RT AMPHIBIA
  BODY TEMPERATURE
  FISHES
  INVERTEBRATES
  REPTILES

POINCARÉ PROBLEM
1902
RT % PROBLEMS

POINCARÉ SPHERES
1902
  
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GS  SYMMETRICAL BODIES
    .BODIES OF REVOLUTION
    ..SPHERES
    ..#POINCARÉ SPHERES
RT  GEOMETRY

POINT DEFECTS
2601 2602
GS  DEFECTS
    .CRYSTAL DEFECTS
    .#POINT DEFECTS
    ....VACANCIES (CRYSTAL DEFECTS)
    ....FRENKEL DEFECTS
    ....CRYSTAL DISLOCATIONS
RT  IMPURITIES
    SURFACE DEFECTS

POINT IMPACT
0710 2310
GS  IMPACT
    #POINT IMPACT
RT  ELECTRON IMPACT
    HYPERVELOCITY IMPACT
    ION IMPACT
    PROTON IMPACT

POINT MATCHING METHOD (MATHEMATICS)
USE  BOUNDARY VALUE PROBLEMS

POINT SOURCES
0710 2310 2402 2903
GS  RADIATION SOURCES
    #POINT SOURCES
RT  DIFFUSE RADIATION
    % ENERGY SOURCES
    HUYGENS PRINCIPLE
    LIGHT SOURCES
    SPHERICAL WAVES

POINT SPREAD FUNCTIONS
1902
GS  FUNCTIONS (MATHEMATICS)
    #POINT SPREAD FUNCTIONS
RT  IMAGE PROCESSING

POINT TO POINT COMMUNICATION
0702 0707
GS  COMMUNICATING
    #POINT TO POINT COMMUNICATION
    ..NASCOM NETWORK
RT  RADIO COMMUNICATION
    TELECOMMUNICATION
    WESTAR SATELLITES
    WIDEBAND COMMUNICATION

POINTERS
USE  DIALS

POINTING CONTROL SYSTEMS
0201 1402 1410 2102
GS  FLIGHT CONTROL
    #POINTING CONTROL SYSTEMS
    ..ANNUAL SUSPENSION AND POINTING
    SYSTEM
RT  % CONTROL
    ENTRY GUIDANCE (STS)
    GUIDANCE (MOTION)
    SPACE FLIGHT
    SPACECRAFT CONTROL
    % SYSTEMS

% POINTS
1902 3406
SN  (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS
    LISTED BELOW)
RT  NONPOINT SOURCES
    POINTS (MATHEMATICS)
    POSITION (LOCATION)

POINTS (MATHEMATICS)
1902
GS  GEOMETRY
    .EUCLIDEAN GEOMETRY
    .#POINTS (MATHEMATICS)
    ...FIXED POINTS (MATHEMATICS)
    ...INFLECTION POINTS
RT  FOCI
    LOCI
    NAKED SINGULARITIES
    % POINTS
    RECIPROCAL THEOREMS
    SINGULARITY (MATHEMATICS)

POISEUILLE FLOW
USE  LAMINAR FLOW

% POISONING
0405 0406 0412
SN  (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS
    LISTED BELOW)
RT  BENZENE POISONING
    BERYLLIUM POISONING
    CARBON MONOXIDE POISONING
    CARBON TETRACHLORIDE POISONING
    CURARE
    HYDROCARBON POISONING
    INTOXICATION
    LEAD POISONING

POISSON DENSITY FUNCTIONS
1905
UF  POISSON PROCESS
GS  FUNCTIONS (MATHEMATICS)
    #POISSON DENSITY FUNCTIONS
    STATISTICAL ANALYSIS
    #POISSON DENSITY FUNCTIONS
RT  CONTINUITY (MATHEMATICS)
    DISCRETE FUNCTIONS
    EXPONENTIAL FUNCTIONS

POISSON EQUATION
1203 1408 1902 3304 3501
GS  ANALYSIS (MATHEMATICS)
    .REAL VARIABLES
    ..DIFFERENTIAL EQUATIONS
    ...PARTIAL DIFFERENTIAL EQUATIONS
    ...#POISSON EQUATION
RT  CLASSICAL MECHANICS
    ELECTROSTATICS
    % EQUATIONS
    ISENTROPE

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# NASA THESAURUS HIERARCHICAL UPDATE

LAPLACE EQUATION  
VORTEX IN CELL TECHNIQUE

POISSON PROCESS  
USE POISSON DENSITY FUNCTIONS  
STOCHASTIC PROCESSES

POISSON RATIO  
1902 1704 3203  
GS MECHANICAL PROPERTIES  
#POISSON RATIO  
RATIOS  
#POISSON RATIO  
AIRY FUNCTION  
COMPRESSIVE STRENGTH  
ELASTIC PROPERTIES  
FIBER STRENGTH  
MODULUS OF ELASTICITY  
NU FACTOR  
STRESS-STRAIN DIAGRAMS  
TENSILE STRENGTH

POLAIRE SATELLITE  
USE D-2 SATELLITES

POLAND  
1305  
GS NATIONS  
#POLAND  
RT CENTRAL EUROPE  
EUROPE

POLAR AURORAS  
USE AURORAS

POLAR CAP ABSORPTION  
1305 2003 2306 3008  
GS ENERGY ABSORPTION  
.RADIATION ABSORPTION  
..ELECTROMAGNETIC ABSORPTION  
...POLAR CAP ABSORPTION  
.THERMAL ABSORPTION  
.#POLAR CAP ABSORPTION  
RT % ABSORPTION

POLAR CAPS  
1305 2003 3008  
RT ANTARCTIC REGIONS  
ARCTIC REGIONS  
% CAPS  
EARTH (PLANET)  
ICE  
MARS (PLANET)

POLAR COORDINATES

1304 1902 1904 2103  
GS COORDINATES  
#POLAR COORDINATES  
RT ASTRONOMICAL COORDINATES  
PLANISPHERES  
SMITH CHART  
SPHERICAL COORDINATES

POLAR CUSPS  
1302 3009  
RT AERONOMY  
% CUSPS  
EARTH MAGNETOSPHERE  
GEOMAGNETIC LATITUDE  
GEOMAGNETIC TAIL  
GEOMAGNETISM  
GEOPHYSICS  
INTERPLANETARY SPACE  
LINES OF FORCE  
MAGNETIC FIELD CONFIGURATIONS  
MAGNETIC FIELDS  
MAGNETOPAUSE  
PLANETARY MAGNETIC FIELDS  
POLAR REGIONS  
SPACE PLASMAS

POLAR GASES  
0603 1507 1601 1703 2404 3304  
GS GASES  
.MOLECULAR GASES  
.#POLAR GASES  
CARBON DIOXIDE LASERS  
GAS COMPOSITION  
GAS DISCHARGES  
GAS DYNAMICS  
GAS LASERS  
GAS MASERS  
POLARIZATION (CHARGE SEPARATION)

POLAR IONOSPHERE BEACON  
USE BEACON SATELLITES  
POLAR METEOROLOGY  
2004 3107  
GS METEOROLOGY  
#POLAR METEOROLOGY  
RT AEROLOGY  
CLIMATOLOGY  
HYDROLOGY  
ICE REPORTING

POLAR NAVIGATION  
1304 2003 2103  
GS NAVIGATION  
#POLAR NAVIGATION

RT AIR NAVIGATION  
CELESTIAL NAVIGATION  
DEAD RECKONING  
DIGITAL NAVIGATION  
INERTIAL NAVIGATION  
LORAN

POLAR ORBIT GEOPHYSICAL OBSERVATORY  
USE POGO

POLAR ORBITS  
1304 1904 2103 3107  
GS ORBITS  
.SPACECRAFT ORBITS  
..SATELLITE ORBITS  
...POLAR ORBITS  
..CIRCULAR ORBITS  
EARTH ORBITS  
ELLIPTICAL ORBITS  
EQUATORIAL ORBITS  
LUNAR ORBITS  
LUNAR SATELLITES  
PLANETARY ORBITS  
SPACE STATION POLAR PLATFORMS  
TIROS SATELLITES  
TWENTY-FOUR HOUR ORBITS

POLAR PLATFORMS (SPACE STATIONS)  
USE SPACE STATION POLAR PLATFORMS

POLAR RADIO BLACKOUT  
0705 1302 2003  
GS ELECTROMAGNETIC INTERFERENCE  
.RADIO FREQUENCY INTERFERENCE  
..BLACKOUT (PROPAGATION)  
...POLAR RADIO BLACKOUT  
RT AURORAL ZONES  
IONOSPHERIC PROPAGATION

POLAR REGIONS  
1304 1305 2003 3008  
UF HIGH LATITUDES  
GS REGIONS  
#POLAR REGIONS  
..ANTARCTIC REGIONS  
...MCMURDO SOUND  
...ROSS ICE SHELF  
..ARCTIC REGIONS  
AURORAL ZONES  
CLIMATOLOGY  
GEOGRAPHY  
PERMAFROST  
POLAR CUSPS  
TEMPERATE REGIONS  
TIMBERLINE





# NASA THESAURUS HIERARCHICAL UPDATE

POLARIZATION (SPIN ALIGNMENT)  
POLARIZATION (WAVES)  
POLARIZED RADIATION

POLARIZATION (CHARGE SEPARATION)  
2304 2307

UF CHARGE SEPARATION  
GS #POLARIZATION (CHARGE SEPARATION)  
.DIELECTRIC POLARIZATION

RT CHARGE DISTRIBUTION  
CHARGE TRANSFER  
DEACTIVATION

DEPOLARIZATION  
ELECTRETS  
ELECTRIC CHARGE  
ELECTRIC MOMENTS  
ELECTRODE FILM BARRIERS  
ELECTROMIGRATION  
HALL EFFECT  
IONOSPHERIC DRIFT  
MAGNETIZATION

OVERVOLTAGE  
POLAR GASES  
POLARITY

% POLARIZATION

PYROELECTRICITY  
% SEPARATION

TAFEL LAW

POLARIZATION (SPIN ALIGNMENT)  
2307

RT ALIGNMENT  
ANISOTROPY

DEACTIVATION  
MAGNETIC PROPERTIES  
MAGNETIZATION

% ORIENTATION

POLARITY

% POLARIZATION

ROTATION

SPIN TESTS

POLARIZATION (WAVES)  
1406 2306 2310

UF POLARIZATION CHARTS  
GS #POLARIZATION (WAVES)  
.CIRCULAR POLARIZATION  
.CROSS POLARIZATION  
.ELLIPTICAL POLARIZATION  
.LINEAR POLARIZATION

RT ANISOTROPIC MEDIA  
ANISOTROPY  
BEAMFORMING  
BIREFRINGENCE

BL LACERTAE OBJECTS  
COLLIMATION

ELECTROMAGNETIC PROPERTIES  
FARADAY EFFECT

KERR ELECTROOPTICAL EFFECT  
KERR MAGNETOOPTICAL EFFECT

MAGNETO-OPTICS  
MONOCHROMATIZATION

OPTICAL COUPLING

OPTICAL PROPERTIES

% ORIENTATION

PHOTODELASTIC ANALYSIS

POLARIMETRY

POLARISCOPE

% POLARIZATION

POLARIZED ELECTROMAGNETIC RADIATION

POLARIZERS

POLARONS

REFRACTIVITY

ROTATION

POLARIZATION CHARACTERISTICS  
2302 2304 2306 2307 2401 2404

GS MAGNETIC PROPERTIES  
#POLARIZATION CHARACTERISTICS

RT BREWSTER ANGLE  
% CHARACTERISTICS

POLARIZED RADIATION

POLARIZATION CHARTS  
USE GRAPHS (CHARTS)

POLARIZATION (WAVES)

POLARIZED ELASTIC WAVES  
2306 2402

GS ELASTIC WAVES

#POLARIZED ELASTIC WAVES

POLARIZED RADIATION

#POLARIZED ELASTIC WAVES

RT S WAVES

SEISMIC WAVES

SOUND WAVES

POLARIZED ELECTROMAGNETIC RADIATION  
2402 2903

GS ELECTROMAGNETIC RADIATION

#POLARIZED ELECTROMAGNETIC RADIATION

..POLARIZED LIGHT

..SYNCHROTRON RADIATION

POLARIZED RADIATION

#POLARIZED ELECTROMAGNETIC RADIATION

..POLARIZED LIGHT

..SYNCHROTRON RADIATION

RT

CROSS POLARIZATION  
EXTRATERRESTRIAL RADIATION  
FARADAY EFFECT  
INFRARED RADIATION  
KERR CELLS

LIGHT (VISIBLE RADIATION)  
LINEAR POLARIZATION

LYMAN ALPHA RADIATION  
LYMAN BETA RADIATION

MAGNETO-OPTICS  
MONOCHROMATIC RADIATION

POLARIZATION (WAVES)  
POLARIZERS

% RADIATION

RADIATIVE TRANSFER

RADIO WAVES

STELLAR RADIATION

ULTRAVIOLET RADIATION

POLARIZED LIGHT  
2306 2310 2903

GS ELECTROMAGNETIC RADIATION

.LIGHT (VISIBLE RADIATION)  
..POLARIZED LIGHT

.POLARIZED ELECTROMAGNETIC RADIATION

..POLARIZED LIGHT

.POLARIZED RADIATION

.POLARIZED ELECTROMAGNETIC RADIATION

..POLARIZED LIGHT

..POLARIZED LIGHT

ELLIPSOMETRY

GEIGENSCHEIN

KERR MAGNETOOPTICAL EFFECT

OPTICAL ACTIVITY

OPTICAL DEPOLARIZATION

PHOTODELASTICITY

ZODIACAL LIGHT

POLARIZED RADIATION  
2306 2402 2903

GS #POLARIZED RADIATION

.POLARIZED ELASTIC WAVES

.POLARIZED ELECTROMAGNETIC RADIATION

..POLARIZED LIGHT

..SYNCHROTRON RADIATION

CAUSTICS (OPTICS)

ELASTIC WAVES

ELECTROMAGNETIC RADIATION

EXTRATERRESTRIAL RADIATION

LINEAR POLARIZATION

PLASMA RADIATION



# NASA THESAURUS HIERARCHICAL UPDATE

MICROCYSTIS  
MICROORGANISMS  
NONPOINT SOURCES  
OIL SLICKS  
POISONS  
PREVENTION  
PUBLIC HEALTH  
PURITY  
QUALITY  
RADIOACTIVE WASTES  
SMOKE ABATEMENT  
SOLID WASTES  
TOXICOLOGY  
WASTE DISPOSAL  
WASTES  
WATER  
WATER RECLAMATION  
WATER TREATMENT

POLLUTION CONTROL  
0504 0505 1406  
RT  
AIR QUALITY  
BIOCHEMICAL OXYGEN DEMAND  
% CONTROL  
DEWATERING  
ENVIRONMENTAL SURVEYS  
FLUE GASES  
FLY ASH  
PARTICULATES

POLLUTION MONITORING  
1409 2001  
RT  
AIR POLLUTION  
AIR QUALITY  
AMBIENCE  
ENVIRONMENT POLLUTION  
GLOBAL AIR POLLUTION  
GROUND STATIONS  
IN SITU MEASUREMENT  
MONITORS  
PARTICULATES  
WARNING SYSTEMS  
WATER POLLUTION

POLLUTION TRANSPORT  
1204  
UF  
RT  
ATMOSPHERIC LOADING  
AEROSOLS  
AIR POLLUTION  
ATMOSPHERIC CIRCULATION  
ATMOSPHERIC DIFFUSION  
COMBUSTION PRODUCTS  
DISPERSING  
ENVIRONMENT POLLUTION  
EXHAUST EMISSION

EXHAUST GASES  
GAS TRANSPORT  
GASEOUS DIFFUSION  
GLOBAL AIR POLLUTION  
PLUMES  
THERMAL POLLUTION  
TRACE CONTAMINANTS  
TRANSPORT PROPERTIES  
TRANSPORT THEORY  
WATER CIRCULATION  
WATER POLLUTION

POLLOIDAL FLUX  
1601  
RT  
MAGNETIC FIELD CONFIGURATIONS  
TOKAMAK DEVICES  
TOROIDAL PLASMAS

POLONIUM  
1204 2406  
GS  
CHEMICAL ELEMENTS  
.METALLOIDS  
.#POLONIUM  
...POLONIUM ISOTOPES  
....POLONIUM 208  
....POLONIUM 209  
....POLONIUM 210  
RT METALS

POLONIUM COMPOUNDS  
0603 1804  
RT % CHEMICAL COMPOUNDS  
% GROUP 6A COMPOUNDS

POLONIUM ISOTOPES  
2406  
GS  
CHEMICAL ELEMENTS  
.METALLOIDS  
.#POLONIUM  
...POLONIUM ISOTOPES  
....POLONIUM 208  
....POLONIUM 209  
....POLONIUM 210  
.NUCLIDES  
..ISOTOPES  
..#POLONIUM ISOTOPES  
...POLONIUM 208  
...POLONIUM 209  
...POLONIUM 210  
RT METALS

POLONIUM 208  
0603 1703 2406  
GS  
CHEMICAL ELEMENTS  
.METALLOIDS

..POLONIUM  
...POLONIUM ISOTOPES  
...#POLONIUM 208  
.NUCLIDES  
..ISOTOPES  
...POLONIUM ISOTOPES  
...#POLONIUM 208  
...RADIOACTIVE ISOTOPES  
...#POLONIUM 208  
RT METALS

POLONIUM 209  
1703 2406  
GS  
CHEMICAL ELEMENTS  
.METALLOIDS  
.#POLONIUM  
...POLONIUM ISOTOPES  
...#POLONIUM 209  
.NUCLIDES  
..ISOTOPES  
...POLONIUM ISOTOPES  
...#POLONIUM 209  
...RADIOACTIVE ISOTOPES  
...#POLONIUM 209  
RT METALS

POLONIUM 210  
1703 2406  
GS  
CHEMICAL ELEMENTS  
.METALLOIDS  
.#POLONIUM  
...POLONIUM ISOTOPES  
...#POLONIUM 210  
.NUCLIDES  
..ISOTOPES  
...POLONIUM ISOTOPES  
...#POLONIUM 210  
...RADIOACTIVE ISOTOPES  
...#POLONIUM 210  
RT METALS

POLYACETYLENE  
0403  
RT  
CONDUCTING POLYMERS  
SEMICONDUCTORS (MATERIALS)

POLYACRYLATES  
USE ACRYLIC RESINS

POLYACRYLONITRILE  
1810  
UF  
GS  
PAN (POLYACRYLONITRILE)  
NITRILES  
.ACRYLONITRILES  
.#POLYACRYLONITRILE

[illegible]

|                                                                                                                                                     |                                                                                                                             |    |                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POLYETHYLENE TEREPHTHALATE<br>1808 1810<br>GS                                                                                                       | ...TETRAHEDRONS<br>BUCKMINSTERFULLERENE<br>FULLERENES<br>POLYTOPES                                                          | RT | POLYMER PHYSICS<br>% POLYMERS<br>POLYWATER                                                                                                                                                                                                                                                                   |
| PLASTICS<br>#POLYETHYLENE TEREPHTHALATE                                                                                                             |                                                                                                                             |    |                                                                                                                                                                                                                                                                                                              |
| .POLYETHYLENES<br>#POLYETHYLENE TEREPHTHALATE<br>TEREPHTHALATE<br>#POLYETHYLENE TEREPHTHALATE<br>ADDITION RESINS<br>MYLAR (TRADEMARK)<br>% POLYMERS | POLYIMIDE RESINS<br>1809 1810<br>GS<br>RESINS<br>#POLYIMIDE RESINS<br>BISMALEIMIDE<br>POLYIMIDES<br>RESIN MATRIX COMPOSITES | RT | POLYMER MATRIX COMPOSITES<br>1810<br>GS<br>COMPOSITE MATERIALS<br>#POLYMER MATRIX COMPOSITES<br>..EPOXY MATRIX COMPOSITES<br>..BORON-EPOXY COMPOSITES<br>..GRAPHITE-POLYIMIDE COMPOSITES<br>..REINFORCED PLASTICS<br>...CARBON FIBER REINFORCED PLASTICS<br>...GLASS FIBER REINFORCED PLASTICS<br>...MICARTA |
| POLYETHYLENES<br>1808 1810<br>GS                                                                                                                    | POLYIMIDES<br>1808 1810<br>GS                                                                                               | RT | ARAMID FIBER COMPOSITES<br>BISMALEIMIDE<br>BORON FIBERS                                                                                                                                                                                                                                                      |
| PLASTICS<br>#POLYETHYLENES<br>#POLYETHYLENE TEREPHTHALATE<br>ADDITION RESINS<br>ETHYLENE<br>SYNTHETIC RESINS<br>THERMOPLASTIC RESINS                | NITROGEN COMPOUNDS<br>.AMIDES<br>.POLYIMIDES<br>...BISMALEIMIDE<br>POLYIMIDE RESINS                                         | %  | CONSTRUCTION MATERIALS<br>FIBER COMPOSITES<br>HYBRID COMPOSITES<br>LAMINATES<br>MATERIALS<br>% MATRICES<br>MATRIX MATERIALS<br>PEEK<br>% POLYMERS<br>PULTRUSION<br>RESIN MATRIX COMPOSITES<br>RESIN TRANSFER MOLDING<br>SHEET MOLDING COMPOUNDS                                                              |
| POLYISOBUTYLENE<br>1808 1810<br>GS                                                                                                                  | POLYISOBUTYLENE<br>1808 1810<br>GS                                                                                          | %  | POLYMER PHYSICS<br>1808 1810 2404<br>RT                                                                                                                                                                                                                                                                      |
| PLASTICS<br>#POLYISOBUTYLENE<br>ADDITION RESINS<br>SYNTHETIC RUBBERS                                                                                | PLASTICS<br>#POLYISOBUTYLENE<br>ADDITION RESINS<br>SYNTHETIC RUBBERS                                                        | %  | GLASS TRANSITION TEMPERATURE<br>% PHYSICS<br>POLYMER BLENDS<br>POLYMER CHEMISTRY<br>% POLYMERS<br>POLYWATER<br>% SCIENCE                                                                                                                                                                                     |
| POLYISOPRENES<br>1805 1808 1810<br>RT                                                                                                               | POLYISOPRENES<br>1805 1808 1810<br>RT                                                                                       | %  | POLYMERIC FILMS<br>1809<br>UF                                                                                                                                                                                                                                                                                |
| RUBBER<br>SYNTHETIC RUBBERS                                                                                                                         | RUBBER<br>SYNTHETIC RUBBERS                                                                                                 | %  | PLASTIC FILMS<br>% POLYMERIC FILMS<br>..KAPTON (TRADEMARK)<br>..MYLAR (TRADEMARK)<br>CASTING<br>CONDUCTING POLYMERS<br>FIBERS<br>% FILMS<br>LANGMUIR-BLODGETT FILMS<br>NYLON (TRADEMARK)<br>PHOTOGRAPHIC FILM                                                                                                |
| POLYMER ALLOYS<br>USE POLYMER BLENDS                                                                                                                | POLYMER ALLOYS<br>USE POLYMER BLENDS                                                                                        | %  |                                                                                                                                                                                                                                                                                                              |
| POLYMER BLENDS<br>1810<br>UF                                                                                                                        | POLYMER BLENDS<br>1810<br>UF                                                                                                | %  |                                                                                                                                                                                                                                                                                                              |
| POLYMER ALLOYS<br>MIXTURES<br>#POLYMER BLENDS<br>COPOLYMERS<br>POLYMER PHYSICS<br>% POLYMERS<br>THERMOPLASTIC RESINS                                | POLYMER ALLOYS<br>MIXTURES<br>#POLYMER BLENDS<br>COPOLYMERS<br>POLYMER PHYSICS<br>% POLYMERS<br>THERMOPLASTIC RESINS        | %  |                                                                                                                                                                                                                                                                                                              |
| POLYMER CHEMISTRY<br>O603 1808 1810<br>RT                                                                                                           | POLYMER CHEMISTRY<br>O603 1808 1810<br>RT                                                                                   | %  |                                                                                                                                                                                                                                                                                                              |
| BIOPOLYMER DENATURATION<br>% CHEMISTRY<br>GLASS TRANSITION TEMPERATURE<br>OLIGOMERS<br>PHOSPHAZENE                                                  | BIOPOLYMER DENATURATION<br>% CHEMISTRY<br>GLASS TRANSITION TEMPERATURE<br>OLIGOMERS<br>PHOSPHAZENE                          | %  |                                                                                                                                                                                                                                                                                                              |



# NASA THESAURUS HIERARCHICAL UPDATE

|                                     |    |                                     |                          |
|-------------------------------------|----|-------------------------------------|--------------------------|
| POLYPHENYLS                         | GS | STATIONS                            | .....TEFLON (TRADEMARK)  |
| 1808 1810                           |    | .GROUND STATIONS                    | PLASTICS                 |
| GS                                  |    | .#POLYSTATION DOPPLER TRACKING      | #POLYTETRAFLUOROETHYLENE |
| PHENYLS                             |    | SYSTEM                              | ..TEFLON (TRADEMARK)     |
| #POLYPHENYLS                        |    | .TRACKING STATIONS                  | RT % POLYMERS            |
| ..TETRAPHENYLS                      |    | .#POLYSTATION DOPPLER TRACKING      | SYNTHETIC RESINS         |
| ..TRIPHENYLS                        |    | SYSTEM                              |                          |
|                                     |    | TRACKING (POSITION)                 | POLYTOPES                |
| POLYPROPYLENE                       |    | #POLYSTATION DOPPLER TRACKING       | 1203 2311                |
| 1808 1810                           |    | SYSTEM                              | RT ANALYTIC GEOMETRY     |
| GS                                  |    | TRACKING NETWORKS                   | EUCIDEAN GEOMETRY        |
| #POLYPROPYLENE                      |    | #POLYSTATION DOPPLER TRACKING       | HYPERPLANES              |
| ADDITION RESINS                     |    | SYSTEM                              | POLYGONS                 |
| SYNTHETIC RESINS                    |    | DOPPLER RADAR                       | POLYHEDRONS              |
|                                     | RT | MISSILE TRACKING                    |                          |
|                                     |    | PULSE RADAR                         | POLYTROPIC PROCESSES     |
| POLYQUINOXALINES                    |    | RADAR NETWORKS                      | 1203 1408 3304           |
| O603 1810                           |    | SATELLITE DOPPLER POSITIONING       | RT ADIABATIC CONDITIONS  |
| RT % CHEMICAL COMPOUNDS             |    | SPACE DETECTION AND TRACKING SYSTEM | % ISOBARS                |
| % POLYMERS                          |    | SPACECRAFT TRACKING                 | THERMODYNAMICS           |
|                                     |    | % SYSTEMS                           |                          |
| POLYSACCHARIDES                     |    |                                     | POLYURETHANE FOAM        |
| O403 1808                           |    |                                     | 1802 1808 1810           |
| GS                                  |    |                                     | RT FOAMS                 |
| ORGANIC COMPOUNDS                   |    |                                     | LOW DENSITY MATERIALS    |
| .CARBOHYDRATES                      |    |                                     | % POLYMERS               |
| .#POLYSACCHARIDES                   |    |                                     | SOILS                    |
| ....CELLULOSE                       |    | ..STYROFOAM (TRADEMARK)             | SPONGES (MATERIALS)      |
| ....FORTISAN (TRADEMARK)            |    | STYRENES                            |                          |
| ....CHITIN                          |    | #POLYSTYRENE                        |                          |
| ....DEXTRANS                        |    | ..POLYSTYRENE                       |                          |
| ....GLYCOGENS                       |    | ..STYROFOAM (TRADEMARK)             |                          |
| ....STARCHES                        |    | ADDITION RESINS                     | POLYURETHANE RESINS      |
| RT GUMS (SUBSTANCES)                | RT | BLOCK COPOLYMERS                    | 1802 1808 1810           |
|                                     |    | SANTOWAX (TRADEMARK)                | GS RESINS                |
| POLYSILANES                         |    | SYNTHETIC RESINS                    | #POLYURETHANE RESINS     |
| O603 1804                           |    | THERMOPLASTIC RESINS                | RT COMPOSITE PROPELLANTS |
| UF OXOSILANES                       |    |                                     |                          |
| RT ORGANOMETALLIC POLYMERS          |    |                                     | POLYVINYL ALCOHOL        |
| POLYCARBOSILANES                    |    |                                     | 1808 1810                |
| % POLYMERS                          |    |                                     | GS HYDROXYL COMPOUNDS    |
| SILANES                             |    |                                     | .ALCOHOLS                |
|                                     |    |                                     | .#POLYVINYL ALCOHOL      |
| POLYSILOXANES                       |    |                                     | PLASTICS                 |
| O603 1804                           |    | ..INORGANIC SULFIDES                | #POLYVINYL ALCOHOL       |
| UF POLYORGANOSILOXANES              |    | ..#POLYSULFIDES                     | ADDITION RESINS          |
| GS #POLYSILOXANES                   |    | SULFUR COMPOUNDS                    | SYNTHETIC RESINS         |
| .METHYL POLYSILOXANES               |    | .SULFIDES                           | VINYL POLYMERS           |
| RT % POLYMERS                       |    | ..INORGANIC SULFIDES                |                          |
| SILICON COMPOUNDS                   | RT | ..#POLYSULFIDES                     |                          |
| SILOXANES                           |    | COMPOSITE PROPELLANTS               | POLYVINYL CHLORIDE       |
|                                     |    |                                     | 1808 1810                |
| POLYSLIPS                           |    |                                     | UF GEON (TRADEMARK)      |
| O603 1805                           |    |                                     | GS PLASTICS              |
| RT % SLIP                           |    |                                     | #POLYVINYL CHLORIDE      |
|                                     |    |                                     | ADDITION RESINS          |
| POLYSTATION DOPPLER TRACKING SYSTEM |    |                                     | CHLORIDES                |
| O709                                |    |                                     | SYNTHETIC RESINS         |
|                                     |    |                                     | TETRAHYDROFURAN          |

VINYL POLYMERS

POLYVINYL FLUORIDE

0603

UF TEDLAR (TRADEMARK)

GS HALOGEN COMPOUNDS

. FLUORINE COMPOUNDS

. . FLUORIDES

. . #POLYVINYL FLUORIDE

ORGANIC COMPOUNDS

. FLUORINE ORGANIC COMPOUNDS

. . FLUOROPOLYMERS

. . #POLYVINYL FLUORIDE

PLASTICS

#POLYVINYL FLUORIDE

VINYL POLYMERS

#POLYVINYL FLUORIDE

RT % POLYMERS

POLYMER

0505 1808 2404

GS WATER

RT #POLYMER

RT ATOMIC STRUCTURE

CHEMICAL BONDS

MOLECULAR STRUCTURE

POLYMER CHEMISTRY

POLYMER PHYSICS

POMERANCHUK THEOREM

1902 2311 2401 2403 2405

GS THEOREMS

RT #POMERANCHUK THEOREM

RT ANTIARTICLES

DEUTERONS

DIFFRACTION PATTERNS

EIKONAL EQUATION

ELASTIC SCATTERING

ELECTRONS

ELEMENTARY PARTICLES

FIELD THEORY (PHYSICS)

FREDHOLM EQUATIONS

GLAUBER THEORY

HIGH ENERGY INTERACTIONS

KAONS

MESONS

NUCLEON-NUCLEON SCATTERING

POMERONS

REGGE POLES

SCATTERING CROSS SECTIONS

POMERONS

2202 2403 2404 2405

RT NUCLEAR REACTIONS

POMERANCHUK THEOREM

PROTON-PROTON REACTIONS

REGGE POLES

SCATTERING CROSS SECTIONS

PONDEROMOTIVE FORCES

2304 2307 2502

GS ELECTROMOTIVE FORCES

RT #PONDEROMOTIVE FORCES

RT ELECTRODYNAMICS

% FORCE

LORENTZ FORCE

RELATIVISTIC PLASMAS

RELATIVITY

PONDS

1305

RT AQUIFERS

GREAT SALT LAKE (UT)

IRRIGATION

LAGOONS

LAKES

LIMNOLOGY

LIQUID WASTES

RESERVOIRS

SOLAR PONDS (HEAT STORAGE)

SURFACE WATER

WASTE DISPOSAL

WATER RESOURCES

WATERSHEDS

WINDPOWERED PUMPS

PONTIAC (MI)

1305

GS CITIES

#PONTIAC (MI)

RT MICHIGAN

PONTRYAGIN PRINCIPLE

0503 0802 1902

RT CALCULUS OF VARIATIONS

MAXIMUM PRINCIPLE

OPTIMIZATION

REACTION TIME

POPULATION INVERSION

1002 1601 2403

GS INVERSIONS

#POPULATION INVERSION

RT ELECTRON PUMPING

ENERGY LEVELS

MOLECULAR RELAXATION

NITROGEN LASERS

NUCLEAR PUMPING

POPULATIONS

STIMULATED EMISSION

POPULATION THEORY

1902 3406

RT POPULATIONS

PROBABILITY THEORY

% THEORIES

POPULATIONS

1905 2403

RT BIOMASS

DISCRIMINANT ANALYSIS (STATISTICS)

POPULATION INVERSION

POPULATION THEORY

PREDATORS

% STATISTICS

PORCELAIN

1801 1805

GS CERAMICS

#PORCELAIN

REFRACTORY MATERIALS

#PORCELAIN

CERAMIC COATINGS

ENAMELS

GLASS

GLAZES

SILICON DIOXIDE

VITREOUS MATERIALS

VITRIFICATION

PORES

USE POROSITY

POROSITY

3408

UF PORES

GS #POROSITY

. MICROPOROSITY

RT AQUIFERS

BUOYANCY

COMPRESSIBILITY

DEFECTS

% DENSITY

DENSITY (MASS/VOLUME)

FORMATIONS

GAS INJECTION

HOLE DISTRIBUTION (MECHANICS)

HYGRAL PROPERTIES

IMPREGNATING

INFILTRATION

INTERSTICES

LEAKAGE

MOISTURE RESISTANCE

PERMEABILITY

PERMEATING



# NASA THESAURUS HIERARCHICAL UPDATE

PINHOLES  
 POROUS BOUNDARY LAYER CONTROL  
 POROUS MATERIALS  
 POROUS PLATES  
 % PROPERTIES  
 SINTERING  
 TEXTURES  
 VOID RATIO  
 VOIDS  
 WETTABILITY

POROUS AIRFOILS  
 USE POROUS BOUNDARY LAYER CONTROL  
 POROUS BOUNDARY LAYER CONTROL  
 1202 3303 3501  
 UF POROUS AIRFOILS  
 GS BOUNDARY LAYER CONTROL  
 #POROUS BOUNDARY LAYER CONTROL  
 RT % CONTROL

CONVECTIVE FLOW  
 EKMAN LAYER  
 FREE CONVECTION  
 HOLES (MECHANICS)  
 MASS TRANSFER  
 PERFORATED PLATES  
 POROSITY  
 WINGS

POROUS MATERIALS  
 0604 1704 1801  
 RT AEROGELS

BRITTLE MATERIALS  
 % CELLS  
 HONEYCOMB STRUCTURES  
 INTERSTICES  
 LOW DENSITY MATERIALS

% MATERIALS  
 METAL POWDER  
 POROSITY  
 POWDER METALLURGY  
 SANDS  
 SOILS  
 SPONGES (MATERIALS)

POROUS PLATES  
 0604 0903 1704  
 GS STRUCTURAL MEMBERS  
 . PLATES (STRUCTURAL MEMBERS)  
 . #POROUS PLATES  
 RT LOW DENSITY MATERIALS  
 POROSITY

POROUS WALLS  
 1203 1803 3303 3501

GS WALLS  
 #POROUS WALLS  
 RT % DIFFUSERS

PORPHINES  
 0403 1808  
 GS ORGANOMETALLIC COMPOUNDS  
 #PORPHINES  
 RT CHLOROPHYLLS  
 HEMOGLOBIN

PORPHYRA  
 0404 1305  
 GS PLANTS (BOTANY)  
 . ALGAE  
 . #PORPHYRA

PORPHYRINS  
 0402 0403 0404 0406 0409 1808  
 GS #PORPHYRINS  
 . CHLOROPHYLLS  
 RT HEMOGLOBIN

PORPOISES  
 0402 0404  
 GS ANIMALS  
 . VERTEBRATES  
 . . MAMMALS  
 . . . MARINE MAMMALS  
 . . . #PORPOISES

PORTABLE EQUIPMENT  
 3404  
 RT % EQUIPMENT  
 LIXISCOPES  
 LOGISTICS  
 MOBILITY  
 STOWAGE (ONBOARD EQUIPMENT)

PORTABLE LIFE SUPPORT SYSTEMS  
 0504 0505 0507  
 UF PLSS  
 GS SUPPORT SYSTEMS  
 . LIFE SUPPORT SYSTEMS  
 . #PORTABLE LIFE SUPPORT SYSTEMS  
 . . . AEPS  
 . . . IMLSS

RT ARGON-OXYGEN ATMOSPHERES  
 BIOPAKS  
 BREATHING APPARATUS  
 EMERGENCY LIFE SUSTAINING SYSTEMS  
 HELIUM-OXYGEN ATMOSPHERES  
 OXYGEN MASKS  
 PRESSURE SUITS  
 % SYSTEMS

% PORTS  
 0102 0202 1101 1103 1104 1105 3110  
 3202

SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)

RT AIRPORTS  
 DRYPDOCKS  
 HARBORS  
 PORTS (OPENINGS)  
 SHIPYARDS  
 WHARVES

PORTS (OPENINGS)  
 3203  
 GS OPENINGS  
 #PORTS (OPENINGS)  
 RT APERTURES  
 CAVITIES  
 DUCTS  
 EXHAUST SYSTEMS  
 ORIFICES  
 OUTLETS  
 % PORTS  
 VENTS  
 % WINDOWS  
 WINDOWS (APERTURES)

PORTUGAL  
 1305  
 GS NATIONS  
 #PORTUGAL  
 . . AZORES  
 RT EUROPE  
 PORTUGUESE SPACE PROGRAM

PORTUGUESE SPACE PROGRAM  
 3409  
 GS PROGRAMS  
 . SPACE PROGRAMS  
 . . EUROPEAN SPACE PROGRAMS  
 . . #PORTUGUESE SPACE PROGRAM  
 RT PORTUGAL

POSEIDON MISSILES  
 3101 3401  
 GS MISSILES  
 . BALLISTIC MISSILES  
 . #POSEIDON MISSILES  
 . SURFACE TO SURFACE MISSILES  
 . . FLEET BALLISTIC MISSILES  
 . . #POSEIDON MISSILES  
 RT BALLISTIC MISSILE SUBMARINES  
 GUIDED MISSILE SUBMARINES

## SEA LAUNCHING

## POSEIDON SATELLITE

3107  
GS ARTIFICIAL SATELLITES  
. FRENCH SATELLITES  
. #POSEIDON SATELLITE  
RT TOPEX

% POSITION  
1902 2103 2311 3009 3406  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT ATTITUDE (INCLINATION)  
POSITION (LOCATION)  
POSITION (TITLE)

## POSITION (LOCATION)

2103 3009  
UF LOCALIZATION  
LOCATION

GS #POSITION (LOCATION)  
. SOLAR POSITION  
RT ALTITUDE

ASTROLABES  
AZIMUTH

BEARING (DIRECTION)  
COLLATING

COLLOCATION  
COORDINATES

DETECTION  
DISTANCE

EPHEMERIDES  
EXPOSURE

% FIXING

GEOMETRY

LATITUDE

LONGITUDE

MISALIGNMENT

NAVIGATION

ORBITAL POSITION ESTIMATION

% ORIENTATION

% POINTS

POSITION ERRORS

POSITION SENSING

POSITIONING

RADAR BEACONS

SITES

SOUND RANGING

SPATIAL DISTRIBUTION

SPHERICAL COORDINATES

STATIONS

SURVEYS

TRACKING (POSITION)

## POSITION (TITLE)

3406

RT EMPLOYEE RELATIONS

EVALUATION

% GRADE

PERSONNEL

% POSITION

RATINGS

## POSITION ERRORS

1904 2102 2103

GS ERRORS

#POSITION ERRORS

..BORESIGHT ERROR

RT ASTROLABES

ERROR SIGNALS

NAVIGATION

OPTICAL CORRECTION PROCEDURE

ORBITAL POSITION ESTIMATION

POSITIONING

VELOCITY ERRORS

## POSITION INDICATORS

2104 2807 3107

GS DISPLAY DEVICES

#POSITION INDICATORS

..PLAN POSITION INDICATORS

..RADIO DIRECTION FINDERS

..SPACECRAFT POSITION INDICATORS

MEASURING INSTRUMENTS

.INDICATING INSTRUMENTS

.#POSITION INDICATORS

...PLAN POSITION INDICATORS

...RADIO DIRECTION FINDERS

...SPACECRAFT POSITION INDICATORS

RT AIRCRAFT INSTRUMENTS

ALTIMETERS

BEACONS

DISTANCE MEASURING EQUIPMENT

FLIGHT INSTRUMENTS

GLOBAL POSITIONING SYSTEM

HEAD-UP DISPLAYS

NAVIGATION AIDS

NAVIGATION INSTRUMENTS

PLOTTERS

POSITION SENSING

RANGE FINDERS

ROCKET-BORNE INSTRUMENTS

SEXTANTS

SOLAR COMPASSES

SOUND LOCALIZATION

## POSITION SENSING

2104

RT

COMPUTER VISION

ELECTRO-OPTICS

POSITION (LOCATION)

POSITION INDICATORS

ROBOTICS

## POSITIONING

3006

RT

ADJUSTING

ALIGNMENT

AMBIGUITY

COLLATING

COLLOCATION

DISPLACEMENT

DISTRIBUTION

% EXPOSURE

FITTING

% FIXING

GLOBAL POSITIONING SYSTEM

INSTRUMENT ORIENTATION

% JOINING

LATITUDE MEASUREMENT

LONGITUDE MEASUREMENT

LOOK ANGLES (ELECTRONICS)

NAVIGATION

% ORIENTATION

PLY ORIENTATION

POSITION (LOCATION)

POSITION ERRORS

RADIO NAVIGATION

RELOCATION

SATELLITE DOPPLER POSITIONING

% SETTING

SPACING

STATIONKEEPING

## POSITIONING DEVICES (MACHINERY)

0904 1412 2104 3006

GS #POSITIONING DEVICES (MACHINERY)

.BOOMS (EQUIPMENT)

.CAMS

.JIGS

RT % DEVICES

HOLDERS

JACKS (LIFTS)

% MACHINERY

SLEWING

## POSITIVE FEEDBACK

0408 0503 1003

UF REGENERATIVE FEEDBACK

GS FEEDBACK

#POSITIVE FEEDBACK

RT AMPLIFICATION

# NASA THESAURUS HIERARCHICAL UPDATE

FEEDBACK AMPLIFIERS  
MULTIVIBRATORS  
NONLINEAR FEEDBACK  
OSCILLATORS  
REGENERATION (ENGINEERING)  
SELF OSCILLATION  
TRANSFER FUNCTIONS

POSITIVE IONS

O603

GS

IONS  
#POSITIVE IONS  
..CATIONS  
...FORMYL IONS  
...VANADYL RADICAL  
..HYDRONIUM IONS

RT

ATOMS  
HYDROGEN IONS  
ION DENSITY (CONCENTRATION)  
IONIC MOBILITY  
IONOSPHERIC ION DENSITY  
MAGNETOSPHERIC ION DENSITY  
METAL IONS  
MOLECULAR IONS  
MONATOMIC MOLECULES  
POLYATOMIC MOLECULES  
PROTONS  
TRIVALENT IONS  
VALENCE

POSITRON ANNIHILATION

2403 2405

UF ELECTRON-POSITRON ANNIHILATION

GS ANNIHILATION REACTIONS

#POSITRON ANNIHILATION

RT

ANTIPARTICLES  
ELECTRON-POSITRON PAIRS  
ELEMENTARY PARTICLES  
MATTER-ANTIMATTER PROPULSION  
NUCLEAR PARTICLES  
PAIR PRODUCTION  
PARTICLES

POSITRONIUM

2403 2405

RT ATOMS

EXCITONS

POSITRONS

2403 2405

GS ANTIMATTER

.ANTIPARTICLES

.#POSITRONS

PARTICLES

.CHARGED PARTICLES

.#POSITRONS  
.ELEMENTARY PARTICLES  
.ANTIPARTICLES  
.#POSITRONS  
.NUCLEAR PARTICLES  
.ANTIPARTICLES  
.#POSITRONS

RT ELECTRON-POSITRON PAIRS

ELECTRON-POSITRON PLASMAS

PAIR PRODUCTION

POST BOOST PROPULSION SYSTEM  
2802 2808 3106

RT

ASCENT TRAJECTORIES

PROPULSION

PROPULSION SYSTEM CONFIGURATIONS

ROCKET ENGINES

SPACECRAFT PROPULSION

%

SYSTEMS

TRAJECTORY CONTROL

POST-BLAST NUCLEAR RADIATION

O411 2205 2405

GS

NUCLEAR RADIATION

#POST-BLAST NUCLEAR RADIATION

RT

FALLOUT

HALF LIFE

RADIANT FLUX DENSITY

%

RADIATION EFFECTS

RADIOACTIVE DECAY

RADIOACTIVITY

VELA SATELLITES

POSTAMPLIFIERS

O701 0705 0905

GS

AMPLIFIERS

#POSTAMPLIFIERS

RT

PREAMPLIFIERS

POSTERIOR SECTIONS

O404

RT

ANATOMY

DORSAL SECTIONS

POSTFLIGHT ANALYSIS

O101 0201 0804 1904

RT

% ANALYZING

% PERFORMANCE

POSTMISSION ANALYSIS (SPACECRAFT)

POSTLAUNCH REPORTS

3405

GS

DOCUMENTS

#POSTLAUNCH REPORTS

REPORTS  
#POSTLAUNCH REPORTS  
PRELAUNCH SUMMARIES  
SPACECRAFT LAUNCHING  
SPACECRAFT PERFORMANCE  
SUMMARIES

RT

POSTMISSION ANALYSIS (SPACECRAFT)

O101

RT

FLIGHT TESTS

POSTFLIGHT ANALYSIS

POSTULATES

USE AXIOMS

POSTURE

O401 0405 0408

RT

HUMAN BODY

ORTHOSTATIC TOLERANCE

PHYSICAL FITNESS

POTABLE LIQUIDS

O505 0507

GS

LIQUIDS

#POTABLE LIQUIDS

..BEVERAGES

...WINES

..POTABLE WATER

PURITY

RT

POTABLE WATER

O401 0505 0507

GS

LIQUIDS

.POTABLE LIQUIDS

.#POTABLE WATER

WATER

#POTABLE WATER

COLD WATER

CONSERVATION

CONSUMABLES (SPACECREW SUPPLIES)

DROUGHT

FRESH WATER

GROUND WATER

LIMNOLOGY

MODULAR INTEGRATED UTILITY SYSTEM

OASES

PURIFICATION

SANITATION

SPRINGS (WATER)

WATER MANAGEMENT

WATER RESOURCES

WATER TABLES

WATER TREATMENT

POTASSIUM

1703  
GS CHEMICAL ELEMENTS  
.ALKALI METALS  
. #POTASSIUM  
...LIQUID POTASSIUM  
...POTASSIUM ISOTOPES  
...POTASSIUM 38  
...POTASSIUM 39  
...POTASSIUM 40  
METALS  
.ALKALI METALS  
. #POTASSIUM  
...LIQUID POTASSIUM  
...POTASSIUM ISOTOPES  
...POTASSIUM 38  
...POTASSIUM 39  
...POTASSIUM 40  
ELECTROLYTE METABOLISM  
KREEP

RT

POTASSIUM ALLOYS  
0603 1701  
GS ALLOYS  
#POTASSIUM ALLOYS

POTASSIUM BROMIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
.BROMINE COMPOUNDS  
..BROMIDES  
.. #POTASSIUM BROMIDES  
.HALIDES  
..BROMIDES  
.. #POTASSIUM BROMIDES  
..METAL HALIDES  
.. #POTASSIUM BROMIDES  
POTASSIUM COMPOUNDS  
#POTASSIUM BROMIDES

POTASSIUM CHLORIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
.CHLORINE COMPOUNDS  
..CHLORIDES  
.. #POTASSIUM CHLORIDES  
.HALIDES  
..CHLORIDES  
.. #POTASSIUM CHLORIDES  
..METAL HALIDES  
.. #POTASSIUM CHLORIDES  
POTASSIUM COMPOUNDS  
#POTASSIUM CHLORIDES

POTASSIUM CHROMATES  
0603 1804

GS CHROMIUM COMPOUNDS  
.CHROMATES  
. #POTASSIUM CHROMATES  
POTASSIUM COMPOUNDS  
#POTASSIUM CHROMATES

POTASSIUM COMPOUNDS  
0403 0603 1804  
GS #POTASSIUM COMPOUNDS  
.ALUM  
.NEPHELINE  
.POTASSIUM BROMIDES  
.POTASSIUM CHLORIDES  
.POTASSIUM CHROMATES  
.POTASSIUM HYDRIDES  
.POTASSIUM HYDROXIDES  
.POTASSIUM IODIDES  
.POTASSIUM NITRATES  
.POTASSIUM OXIDES  
.POTASSIUM PERCHLORATES  
.POTASSIUM PEROXIDES  
.POTASSIUM PHOSPHATES  
.POTASSIUM SILICATES  
RT % ALKALI METAL COMPOUNDS  
% CHEMICAL COMPOUNDS  
% METAL COMPOUNDS

POTASSIUM HYDRIDES  
0603 1807  
GS HYDROGEN COMPOUNDS  
.HYDRIDES  
..METAL HYDRIDES  
.. #POTASSIUM HYDRIDES  
POTASSIUM COMPOUNDS  
#POTASSIUM HYDRIDES

POTASSIUM HYDROXIDES  
0603 1804  
GS BASES (CHEMICAL)  
.ALKALIES  
. #POTASSIUM HYDROXIDES  
HYDROXIDES  
#POTASSIUM HYDROXIDES  
POTASSIUM COMPOUNDS  
#POTASSIUM HYDROXIDES

POTASSIUM IODIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
.HALIDES  
..METAL HALIDES  
.. #POTASSIUM IODIDES  
..IODINE COMPOUNDS  
..IODIDES

POTASSIUM IODIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
.CHLORINE COMPOUNDS  
..PERCHLORATES  
.. #POTASSIUM PERCHLORATES  
POTASSIUM COMPOUNDS  
#POTASSIUM PERCHLORATES  
EXPLOSIVES  
SOLID ROCKET PROPELLANTS

POTASSIUM ISOTOPES  
2406  
GS CHEMICAL ELEMENTS  
.ALKALI METALS  
.POTASSIUM  
.. #POTASSIUM ISOTOPES  
...POTASSIUM 38  
...POTASSIUM 39  
...POTASSIUM 40  
.NUCLIDES  
..ISOTOPES  
.. #POTASSIUM ISOTOPES  
...POTASSIUM 38  
...POTASSIUM 39  
...POTASSIUM 40  
METALS  
.ALKALI METALS  
.POTASSIUM  
.. #POTASSIUM ISOTOPES  
...POTASSIUM 38  
...POTASSIUM 39  
...POTASSIUM 40  
POTASSIUM NITRATES  
0603 1804  
GS NITROGEN COMPOUNDS  
.NITRATES  
..INORGANIC NITRATES  
.. #POTASSIUM NITRATES  
POTASSIUM COMPOUNDS  
#POTASSIUM NITRATES

POTASSIUM OXIDES  
0603 1804  
GS CHALCOGENIDES  
.OXIDES  
..METAL OXIDES  
.. #POTASSIUM OXIDES  
POTASSIUM COMPOUNDS  
#POTASSIUM OXIDES

POTASSIUM PERCHLORATES  
0603 1804  
GS HALOGEN COMPOUNDS  
.CHLORINE COMPOUNDS  
..PERCHLORATES  
.. #POTASSIUM PERCHLORATES  
POTASSIUM COMPOUNDS  
#POTASSIUM PERCHLORATES  
EXPLOSIVES  
SOLID ROCKET PROPELLANTS

# NASA THESAURUS HIERARCHICAL UPDATE

POTASSIUM PEROXIDES  
 O603 1804  
 GS POTASSIUM COMPOUNDS  
 #POTASSIUM PEROXIDES

POTASSIUM PHOSPHATES  
 O603 1804  
 GS PHOSPHORUS COMPOUNDS  
 .PHOSPHATES  
 .#POTASSIUM PHOSPHATES  
 POTASSIUM COMPOUNDS  
 #POTASSIUM PHOSPHATES

POTASSIUM SILICATES  
 O603 1804  
 GS POTASSIUM COMPOUNDS  
 #POTASSIUM SILICATES  
 SILICON COMPOUNDS  
 .SILICATES  
 .#POTASSIUM SILICATES  
 RT MINERALS

POTASSIUM 38  
 O603 1703 2406  
 GS CHEMICAL ELEMENTS  
 .ALKALI METALS  
 .#POTASSIUM  
 .#POTASSIUM ISOTOPES  
 ...#POTASSIUM 38  
 .NUCLIDES  
 .ISOTOPES  
 ...POTASSIUM ISOTOPES  
 ...#POTASSIUM 38  
 ...RADIOACTIVE ISOTOPES  
 ...#POTASSIUM 38  
 METALS  
 .ALKALI METALS  
 .#POTASSIUM  
 .#POTASSIUM ISOTOPES  
 ...#POTASSIUM 38

POTASSIUM 39  
 O603 1703 2406  
 GS CHEMICAL ELEMENTS  
 .ALKALI METALS  
 .#POTASSIUM  
 .#POTASSIUM ISOTOPES  
 ...#POTASSIUM 39  
 .NUCLIDES  
 .ISOTOPES  
 ...POTASSIUM ISOTOPES  
 ...#POTASSIUM 39  
 METALS  
 .ALKALI METALS

...POTASSIUM  
 ...POTASSIUM ISOTOPES  
 ...#POTASSIUM 39

POTASSIUM 40  
 1703 2406  
 GS CHEMICAL ELEMENTS  
 .ALKALI METALS  
 .#POTASSIUM  
 .#POTASSIUM ISOTOPES  
 ...#POTASSIUM 40  
 .NUCLIDES  
 .ISOTOPES  
 ...POTASSIUM ISOTOPES  
 ...#POTASSIUM 40  
 ...RADIOACTIVE ISOTOPES  
 ...#POTASSIUM 40  
 METALS  
 .ALKALI METALS  
 .#POTASSIUM  
 .#POTASSIUM ISOTOPES  
 ...#POTASSIUM 40

POTATOES  
 O409  
 GS FARM CROPS  
 #POTATOES  
 PLANTS (BOTANY)  
 #POTATOES  
 VEGETABLES  
 #POTATOES  
 RT % FOOD

% POTENTIAL  
 1001 2311 3406  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT COULOMB POTENTIAL  
 ELECTRIC POTENTIAL  
 GEOPOTENTIAL  
 IONIZATION POTENTIALS  
 KLEIN-DUNHAM POTENTIAL  
 MYOELECTRIC POTENTIALS  
 NUCLEON POTENTIAL  
 OPEN CIRCUIT VOLTAGE  
 PLASMA POTENTIALS  
 POTENTIAL ENERGY  
 POTENTIAL FIELDS  
 POTENTIAL THEORY  
 YUKAWA POTENTIAL

POTENTIAL ENERGY  
 1309 2308 2404  
 GS #POTENTIAL ENERGY

.ELECTRIC POTENTIAL  
 .BIOELECTRIC POTENTIAL  
 .CONTACT POTENTIALS  
 .COULOMB POTENTIAL  
 .LIENARD POTENTIAL  
 .LOW VOLTAGE  
 .OPEN CIRCUIT VOLTAGE  
 .PHOTOVOLTAGES  
 .QUANTUM WELLS  
 .SPIKE POTENTIALS  
 .THRESHOLD VOLTAGE  
 .GEOPOTENTIAL HEIGHT  
 .IONIZATION POTENTIALS  
 .NUCLEAR POTENTIALS  
 .PLASMA POTENTIALS  
 .CHEMICAL ENERGY  
 .ELECTRIC ENERGY STORAGE  
 .ENERGY  
 .ENERGY STORAGE  
 .FROUDE NUMBER  
 .GEOPOTENTIAL  
 .INTERNAL ENERGY  
 .KINETIC ENERGY  
 .LAGRANGIAN FUNCTION  
 .MORSE POTENTIAL  
 .% POTENTIAL

POTENTIAL FIELDS  
 2308 2311 2401  
 RT FIELD THEORY (PHYSICS)  
 .% POTENTIAL

POTENTIAL FLOW  
 1202 2308 2311  
 UF IRROTATIONAL FLOW  
 GS FLUID FLOW  
 #POTENTIAL FLOW  
 .EQUIPOTENTIALS  
 RT CARTAN SPACE  
 HEAT TRANSMISSION  
 INVISCID FLOW  
 VORTICITY

POTENTIAL GRADIENTS  
 O101 1202 1308 2311 2402 3408  
 GS GRADIENTS  
 #POTENTIAL GRADIENTS  
 RT PRESSURE GRADIENTS  
 SPARK GAPS  
 TEMPERATURE GRADIENTS

POTENTIAL THEORY  
 O101 1202 1308 1902 2311 2402  
 RT DIFFERENTIAL EQUATIONS  
 JACOBI INTEGRAL

LENNARD-JONES POTENTIAL  
% POTENTIAL  
STREAM FUNCTIONS (FLUIDS)  
% THEORIES

% POTENTIOMETERS  
0902 0905 1002 2304  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT POTENTIOMETERS (INSTRUMENTS)  
POTENTIOMETERS (RESISTORS)

POTENTIOMETERS (INSTRUMENTS)  
0905 1002 1406 3501  
GS MEASURING INSTRUMENTS  
#POTENTIOMETERS (INSTRUMENTS)

RT BOLOMETERS  
ELECTRIC POTENTIAL  
ELECTRICAL MEASUREMENT  
ELECTROMETERS  
% POTENTIOMETERS  
THERMOCOUPLE PYROMETERS  
THERMOCOUPLES  
VOLT METERS

POTENTIOMETERS (RESISTORS)  
0905  
GS ATTENUATORS  
.RESISTORS  
.#POTENTIOMETERS (RESISTORS)  
RT % POTENTIOMETERS

POTENTIOMETRIC ANALYSIS  
0902 0905 1002 2304  
UF POTENTIOMETRY  
GS CHEMICAL TESTS  
.CHEMICAL ANALYSIS  
.#POTENTIOMETRIC ANALYSIS

POTENTIOMETRY  
USE POTENTIOMETRIC ANALYSIS

POTEZ AIRCRAFT  
0201 0207  
RT % AIRCRAFT

POTOMAC RIVER VALLEY (MD-VA-WV)  
1305 1306  
GS VALLEYS  
#POTOMAC RIVER VALLEY (MD-VA-WV)  
RT DISTRICT OF COLUMBIA  
MARYLAND  
VIRGINIA  
WEST VIRGINIA

POTTING COMPOUNDS  
0701 0904 0905 1410 1502 1504 1805  
RT % COMPOUNDS  
ENCAPSULATING  
INSULATION

POURING  
3407  
RT CASTINGS  
CASTINGS

POWDER (PARTICLES)  
1704 1805 3203  
GS PARTICLES  
#POWDER (PARTICLES)  
..FINES  
..METAL POWDER  
...PLATINUM BLACK  
...POWDERED ALUMINUM

RT COMPRESSIBILITY  
CROP DUSTING  
DUST  
EXPLOSIVES  
FLAKES  
FLOUR (FOOD)  
GRANULAR MATERIALS  
OBSIDIAN  
PUMICE  
SIZE SEPARATION

POWDER METALLURGY  
1504 1701 1704  
RT ALLOYING  
ALLOYS  
AUTOCCLAVING  
CERMETS  
COMBUSTION SYNTHESIS  
COMMUNITION  
COMPACTING  
COMPOSITE MATERIALS  
ELECTRODEPOSITION  
LIQUID PHASE SINTERING  
LOW DENSITY MATERIALS  
METAL MATRIX COMPOSITES  
METAL PARTICLES  
METAL POWDER  
% METALLURGY  
MIXED CRYSTALS  
POROUS MATERIALS  
PREFORMS  
REACTION BONDING  
SINTERED ALUMINUM POWDER  
SINTERING

VACUUM MELTING

POWDERED ALUMINUM  
1504 1704  
GS PARTICLES  
.METAL PARTICLES  
..METAL POWDER  
...#POWDERED ALUMINUM  
....SINTERED ALUMINUM POWDER  
.POWDER (PARTICLES)  
..METAL POWDER  
...#POWDERED ALUMINUM  
....SINTERED ALUMINUM POWDER  
ALUMINUM  
LITHIUM ALUMINUM HYDRIDES

POWDERED METALS  
USE METAL POWDER

% POWER  
0301 0303 1902 2311 2801 2805 2808  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT ELECTRIC GENERATORS  
FLUID POWER  
FLUX (RATE)  
FLUX DENSITY  
HORSEPOWER  
RESOLUTION  
THRUST

POWER AMPLIFIERS  
0905  
GS AMPLIFIERS  
#POWER AMPLIFIERS  
RT AMPLIDYNES  
CYCLOTRON RESONANCE DEVICES  
FEEDBACK AMPLIFIERS  
MAGNETIC AMPLIFIERS  
PARAMETRIC AMPLIFIERS  
PUSH-PULL AMPLIFIERS  
TRANSISTOR AMPLIFIERS  
TRAVELING WAVE AMPLIFIERS

POWER BEAMING  
3107 3109  
UF BEAMED POWER  
GS #POWER BEAMING  
.LASER POWER BEAMING  
.MICROWAVE POWER BEAMING  
.SATELLITE POWER TRANSMISSION  
ENERGY CONVERSION  
LASER PROPULSION  
MICROWAVE TRANSMISSION

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| % POWER TRANSMISSION<br>SOLAR POWER SATELLITES<br>SPACECRAFT POWER SUPPLIES                                                                                                                                                                                                                                                           | GS | AMPLIFICATION<br>#POWER GAIN<br>RT CATT DEVICES<br>HIGH GAIN<br>OPEN CIRCUIT VOLTAGE                                                                                                                                                                                                                                                                                                | RT | LISTED BELOW)<br>COGENERATION<br>ELECTRIC POWER PLANTS<br>ENGINES<br>ENRICO FERMI ATOMIC POWER PLANT<br>GEOTHERMAL ENERGY UTILIZATION<br>HALLAM NUCLEAR POWER FACILITY<br>HYDROELECTRIC POWER STATIONS<br>HYDROELECTRICITY<br>ML-1 NUCLEAR POWER PLANT<br>SOLAR SEA POWER PLANTS<br>SOLAR THERMAL ELECTRIC POWER PLANTS |
|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |
| POWER CONDITIONING<br>0301 2304<br>UF POWER PROCESSING SYSTEMS<br>RT % CONDITIONING<br>ELECTRIC CURRENT<br>ELECTRIC GENERATORS<br>ELECTRIC POTENTIAL<br>ENERGY CONVERSION<br>ENERGY CONVERSION EFFICIENCY<br>OUTPUT<br>SATELLITE SOLAR ENERGY CONVERSION<br>SATELLITE SOLAR POWER STATIONS                                            | GS | POWER GENERATORS<br>USE ELECTRIC GENERATORS<br>POWER LIMITED SPACECRAFT<br>0303 3110<br>RT % SPACECRAFT                                                                                                                                                                                                                                                                             | RT | POWER PROCESSING SYSTEMS<br>USE POWER CONDITIONING<br>POWER REACTORS<br>2204<br>RT NUCLEAR POWER REACTORS<br>% REACTORS<br>SATURABLE REACTORS                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |
| POWER CONVERTERS<br>0902<br>RT % CONVERTERS<br>TORQUE CONVERTERS                                                                                                                                                                                                                                                                      | GS | POWER LIMITERS<br>0302 0303 1504<br>RT ATTENUATORS<br>CLAMPING CIRCUITS<br>CLIPPER CIRCUITS<br>LIMITER CIRCUITS<br>POWER LINES<br>0904 2304<br>GS TRANSMISSION LINES<br>#POWER LINES<br>RT BUS CONDUCTORS<br>% CABLES<br>COAXIAL CABLES<br>ELECTRIC POWER TRANSMISSION<br>ELECTRIC WIRE<br>SUBMARINE CABLES<br>SUPERCONDUCTING POWER TRANSMISSION<br>UNDERGROUND TRANSMISSION LINES | RT | POWER SERIES<br>1902<br>GS ANALYSIS (MATHEMATICS)<br>.CALCULUS<br>..SERIES (MATHEMATICS)<br>..#POWER SERIES<br>....TAYLOR SERIES<br>.....MACLAURIN SERIES<br>..REAL VARIABLES<br>..SERIES (MATHEMATICS)<br>..#POWER SERIES<br>....TAYLOR SERIES<br>.....MACLAURIN SERIES<br>ANALYTIC FUNCTIONS<br>BESSEL FUNCTIONS      |
|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |
| POWER DENSITY (ELECTROMAGNETIC)<br>USE RADIANT FLUX DENSITY                                                                                                                                                                                                                                                                           | GS | POWER LOSS<br>2203<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>ENERGY DISSIPATION<br>POWER EFFICIENCY                                                                                                                                                                                                                               | RT | POWER SPECTRA<br>1902 2311<br>GS SPECTRA<br>#POWER SPECTRA<br>..CEPSTRA<br>ACQUSTICS<br>CEPSTRAL ANALYSIS<br>ENERGY SPECTRA<br>FLUX DENSITY<br>LOUDNESS<br>MAXIMUM ENTROPY METHOD                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |
| POWER EFFICIENCY<br>2203 2204 2405<br>GS #POWER EFFICIENCY<br>RT COMBUSTION EFFICIENCY<br>COMPRESSOR EFFICIENCY<br>HORSEPOWER<br>NOZZLE EFFICIENCY<br>POWER FACTOR CONTROLLERS<br>POWER LOSS<br>PROPELLER EFFICIENCY<br>PROPULSION SYSTEM PERFORMANCE<br>PROPULSIVE EFFICIENCY<br>THERMODYNAMIC EFFICIENCY<br>TRANSMISSION EFFICIENCY | GS | POWER MODULES (STS)<br>0903 3110<br>GS MODULES<br>#POWER MODULES (STS)<br>RT ORBITAL MANEUVERING VEHICLES<br>PAYLOAD DELIVERY (STS)<br>SOLAR ARRAYS<br>SPACE TRANSPORTATION SYSTEM<br>SPACECRAFT POWER SUPPLIES                                                                                                                                                                     | RT | % POWER SUPPLIES<br>0701 0904 0905 0303<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |
| POWER FACTOR CONTROLLERS<br>0904<br>GS CONTROLLERS<br>#POWER FACTOR CONTROLLERS<br>RT CURRENT REGULATORS<br>ELECTRIC MOTORS<br>ENERGY CONSERVATION<br>ENERGY CONVERSION EFFICIENCY<br>INDUCTION MOTORS<br>POWER EFFICIENCY<br>VOLTAGE REGULATORS                                                                                      | GS | POWER GAIN<br>0301 0302 1504 2203 2204 3404<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                                | RT | POWER GAIN<br>0301 0302 1504 2203 2204 3404<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                         |

RT AIRCRAFT ENGINES  
AIRCRAFT POWER SUPPLIES  
AUXILIARY POWER SOURCES  
ELECTRIC BATTERIES  
ELECTRIC GENERATORS  
ELECTRIC POWER SUPPLIES  
ELECTRON SOURCES  
ENERGY REQUIREMENTS  
HEAT SOURCES  
LEAD ACID BATTERIES  
LINE CURRENT  
LITHIUM SULFUR BATTERIES  
NUCLEAR AUXILIARY POWER UNITS  
PLASMA POWER SOURCES  
PROPELLANTS  
RECTIFIERS  
SOLAR GENERATORS  
SPACECRAFT POWER SUPPLIES  
VOLTAGE CONVERTERS (AC TO AC)  
VOLTAGE CONVERTERS (DC TO DC)

POWER SUPPLY CIRCUITS  
0904  
GS CIRCUITS  
#POWER SUPPLY CIRCUITS  
CURRENT REGULATORS  
RECTIFIERS  
TRANSFORMERS  
VOLTAGE CONVERTERS (DC TO DC)  
VOLTAGE REGULATORS

% POWER TRANSMISSION  
0705 0710 0901 0902 1504 2308 3404  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT BUS CONDUCTORS  
ELECTRIC OUTLETS  
ELECTRIC POWER TRANSMISSION  
ELECTRICAL ENGINEERING  
ELECTRIFICATION  
HYDROELECTRIC POWER STATIONS  
MECHANICAL DRIVES  
POWER BEAMING  
WINDMILLS (WINDPOWERED MACHINES)

POWER TRANSMISSION (LASERS)  
USE LASER POWER BEAMING

POWER TRANSMISSION (MICROWAVE)  
USE MICROWAVE POWER BEAMING

POWERED LIFT AIRCRAFT  
0201  
RT % AIRCRAFT

EXTERNALLY BLOWN FLAPS  
SHORT TAKEOFF AIRCRAFT  
STOVL AIRCRAFT  
VERTICAL TAKEOFF AIRCRAFT

POWERED MODELS  
0804  
SN (LIMITED TO TEST FACILITIES)  
GS MODELS  
.WIND TUNNEL MODELS  
.POWERED MODELS  
AIRCRAFT MODELS  
DYNAMIC MODELS

RT

POYNTING THEOREM  
1002 2307 2402  
GS THEOREMS  
#POYNTING THEOREM  
RT % ELECTRIC POWER  
ELECTROMAGNETIC RADIATION  
ENERGY TRANSFER  
MAXWELL EQUATION  
VECTOR ANALYSIS

POYNTING-ROBERTSON EFFECT  
2902 3005 3006  
RT % EFFECTS  
MICROMETEORIDS  
ORBITAL MECHANICS  
RADIATION EFFECTS  
ZODIACAL DUST  
ZODIACAL LIGHT

PPI (POSITION INDICATORS)  
USE PLAN POSITION INDICATORS

PPM (MODULATION)  
USE PULSE POSITION MODULATION

PRACTICES  
USE PROCEDURES

PRAESEP STAR CLUSTERS  
3001 3009  
GS CELESTIAL BODIES  
.STAR CLUSTERS  
.OPEN CLUSTERS  
..#PRAESEP STAR CLUSTERS  
.STARS  
.#PRAESEP STAR CLUSTERS  
RT % CLUSTERS

PRAETERSONIC DEVICES  
2301 2312  
RT MICROWAVE FREQUENCIES

PIEZOELECTRIC TRANSDUCERS  
THIN FILMS  
ULTRAHIGH FREQUENCIES

PRAIRIES  
USE GRASSLANDS

PRANDTL NUMBER  
1202 1203 1204 2303  
GS RATIOS  
.DIMENSIONLESS NUMBERS  
.#PRANDTL NUMBER  
FORCED CONVECTION  
GRASHOF NUMBER  
HEAT TRANSFER  
INVISCID FLOW  
MOMENTUM TRANSFER  
NUSSELT NUMBER  
PECLET NUMBER  
REYNOLDS NUMBER  
SCHMIDT NUMBER  
THERMODYNAMIC PROPERTIES  
VISCOUS FLOW

PRANDTL-MEYER EXPANSION  
1202 1203  
GS EXPANSION  
#PRANDTL-MEYER EXPANSION  
BLASIUS EQUATION  
FALKNER-SKAN EQUATION  
FLOW DEFLECTION  
LAMINAR FLOW  
METHOD OF CHARACTERISTICS  
NEWTON PRESSURE LAW  
SUPERSONIC FLOW  
TWO DIMENSIONAL FLOW

PRASEODYMIUM  
1703  
GS CHEMICAL ELEMENTS  
.RARE EARTH ELEMENTS  
.#PRASEODYMIUM  
...PRASEODYMIUM ISOTOPES  
METALS  
.RARE EARTH ELEMENTS  
.#PRASEODYMIUM  
...PRASEODYMIUM ISOTOPES  
RT DIDYMIUM  
PRASEODYMIUM COMPOUNDS

PRASEODYMIUM COMPOUNDS  
1703  
GS RARE EARTH COMPOUNDS  
.#PRASEODYMIUM COMPOUNDS  
RT % CHEMICAL COMPOUNDS



# NASA THESAURUS HIERARCHICAL UPDATE

|                              |  |  |  |
|------------------------------|--|--|--|
| % METAL COMPOUNDS            |  |  |  |
| PRASEODYMIUM                 |  |  |  |
| PRASEODYMIUM ISOTOPES        |  |  |  |
| 2406                         |  |  |  |
| UF                           |  |  |  |
| GS                           |  |  |  |
| PRASEODYMIUM 144             |  |  |  |
| CHEMICAL ELEMENTS            |  |  |  |
| .NUCLIDES                    |  |  |  |
| ..ISOTOPES                   |  |  |  |
| ..#PRASEODYMIUM ISOTOPES     |  |  |  |
| .RARE EARTH ELEMENTS         |  |  |  |
| ..PRASEODYMIUM               |  |  |  |
| ..#PRASEODYMIUM ISOTOPES     |  |  |  |
| METALS                       |  |  |  |
| .RARE EARTH ELEMENTS         |  |  |  |
| ..PRASEODYMIUM               |  |  |  |
| ..#PRASEODYMIUM ISOTOPES     |  |  |  |
| PRASEODYMIUM 144             |  |  |  |
| USE PRASEODYMIUM ISOTOPES    |  |  |  |
| PRE-IMBRIAN PERIOD           |  |  |  |
| 1301                         |  |  |  |
| RT                           |  |  |  |
| LUNAR COMPOSITION            |  |  |  |
| LUNAR CRATERS                |  |  |  |
| LUNAR EVOLUTION              |  |  |  |
| LUNAR GEOLOGY                |  |  |  |
| LUNAR ROCKS                  |  |  |  |
| PRE-MAIN SEQUENCE STARS      |  |  |  |
| 3001                         |  |  |  |
| GS                           |  |  |  |
| CELESTIAL BODIES             |  |  |  |
| .STARS                       |  |  |  |
| ..PROTOSTARS                 |  |  |  |
| ..#PRE-MAIN SEQUENCE STARS   |  |  |  |
| ....T TAURI STARS            |  |  |  |
| MAIN SEQUENCE STARS          |  |  |  |
| STAR FORMATION               |  |  |  |
| STELLAR EVOLUTION            |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |
| % SATURATION                 |  |  |  |
| SATURATION (CHEMISTRY)       |  |  |  |
| % SEPARATION                 |  |  |  |
| SETTLING                     |  |  |  |
| SOLUBILITY                   |  |  |  |
| SUPERSATURATION              |  |  |  |
| UNSATURATION (CHEMISTRY)     |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |
| % SATURATION                 |  |  |  |
| SATURATION (CHEMISTRY)       |  |  |  |
| % SEPARATION                 |  |  |  |
| SETTLING                     |  |  |  |
| SOLUBILITY                   |  |  |  |
| SUPERSATURATION              |  |  |  |
| UNSATURATION (CHEMISTRY)     |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |
| % SATURATION                 |  |  |  |
| SATURATION (CHEMISTRY)       |  |  |  |
| % SEPARATION                 |  |  |  |
| SETTLING                     |  |  |  |
| SOLUBILITY                   |  |  |  |
| SUPERSATURATION              |  |  |  |
| UNSATURATION (CHEMISTRY)     |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |
| % SATURATION                 |  |  |  |
| SATURATION (CHEMISTRY)       |  |  |  |
| % SEPARATION                 |  |  |  |
| SETTLING                     |  |  |  |
| SOLUBILITY                   |  |  |  |
| SUPERSATURATION              |  |  |  |
| UNSATURATION (CHEMISTRY)     |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |
| % SATURATION                 |  |  |  |
| SATURATION (CHEMISTRY)       |  |  |  |
| % SEPARATION                 |  |  |  |
| SETTLING                     |  |  |  |
| SOLUBILITY                   |  |  |  |
| SUPERSATURATION              |  |  |  |
| UNSATURATION (CHEMISTRY)     |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |
| % SATURATION                 |  |  |  |
| SATURATION (CHEMISTRY)       |  |  |  |
| % SEPARATION                 |  |  |  |
| SETTLING                     |  |  |  |
| SOLUBILITY                   |  |  |  |
| SUPERSATURATION              |  |  |  |
| UNSATURATION (CHEMISTRY)     |  |  |  |
| PRECIPITATION (METEOROLOGY)  |  |  |  |
| 2003                         |  |  |  |
| GS                           |  |  |  |
| #PRECIPITATION (METEOROLOGY) |  |  |  |
| .GRAUPEL                     |  |  |  |
| .HAIL                        |  |  |  |
| .RAIN                        |  |  |  |
| ..ACID RAIN                  |  |  |  |
| .SNOW                        |  |  |  |
| .SNOW COVER                  |  |  |  |
| ALPINE METEOROLOGY           |  |  |  |
| ANVIL CLOUDS                 |  |  |  |
| ATMOSPHERIC MOISTURE         |  |  |  |
| CAP CLOUDS                   |  |  |  |
| CIRROCUMULUS CLOUDS          |  |  |  |
| CIRROSTRATUS CLOUDS          |  |  |  |
| CLIMATOLOGY                  |  |  |  |
| CLOUD PHYSICS                |  |  |  |
| RT                           |  |  |  |
| PRECIPITATION (CHEMISTRY)    |  |  |  |
| 0603 3407                    |  |  |  |
| RT                           |  |  |  |
| AGGLOMERATION                |  |  |  |
| CEMENTATION                  |  |  |  |
| % CHEMISTRY                  |  |  |  |
| COAGULATION                  |  |  |  |
| COLLOIDING                   |  |  |  |
| CONCENTRATING                |  |  |  |
| CRYSTALLIZATION              |  |  |  |
| DEPOSITION                   |  |  |  |
| DISSOLVING                   |  |  |  |
| FILTRATION                   |  |  |  |
| FLOCCULATING                 |  |  |  |
| HYDROMETALLURGY              |  |  |  |
| HYDROMETEOROLOGY             |  |  |  |
| MATERIALS RECOVERY           |  |  |  |
| PRECIPITATES                 |  |  |  |
| % PRECIPITATION              |  |  |  |
| PRECIPITATORS                |  |  |  |

[illegible]

[illegible]

```

PREMIXED FLAMES
3301
GS #FLAMES
RT #PREMIXED FLAMES
RT CARBURETORS
FLAME PROPAGATION
GAS MIXTURES
MIXING
PREMIXING
REACTING FLOW
TURBULENT COMBUSTION

PREMIXING
1203 3501
GS MIXING
RT #PREMIXING
RT FUEL-AIR RATIO
FUELS
GAS MIXTURES
HOMOGENIZING
IGNITION
JET MIXING FLOW
PREMIXED FLAMES
SPRAYING

PREPARATION
1502 1504 1507 3404 3407
GS #PREPARATION
.PRECONDITIONING
.PRETREATMENT
..PRESTRESSING
.PREWHLRLING
.PREWHITENING
RT ASSEMBLING
PREMATURE OPERATION
% PRIMING

PREPOLYMERS
1808 1810
GS #PREPOLYMERS
.DIMERS
.TRIMERS
RT MONOMERS
% POLYMERS

PREPREGS
1804
RT COMPOSITE MATERIALS
EPOXY RESINS
FUNCTIONALLY GRADIENT MATERIALS
LAMINATES
RESIN MATRIX COMPOSITES

PREPROCESSING
2102

RT DATA PROCESSING
DATA REDUCTION
IMAGE PROCESSING

PRESBYOPIA
O405 O408
RT VISION

PRESELECTORS
USE PREAMPLIFIERS

PRESENTATION
3406 3407
RT INFORMATION

PRESERVATIVES
O505 1802 1808
RT ADDITIVES
% AGENTS
ANTICOAGULANTS
ANTIOXIDANTS
NEUTRALIZERS
PENETRANTS
PRESERVING
RETARDANTS
STABILIZERS (AGENTS)

PRESERVING
O504 O505 O508
GS FOOD PROCESSING
#PRESERVING
RT BIOPAKS
% CONTAINERS
CORROSION PREVENTION
COVERINGS
CURING
DEGRADATION
DEHYDRATED FOOD
% FOOD
FREEZE DRYING
FREEZING
FROZEN FOODS
IMPREGNATING
IRRADIATION
PACKAGING
PRESERVATIVES
RADIATION EFFECTS
REFRIGERATING
% STORAGE
WEATHERPROOFING

PRESIDENTIAL REPORTS
3405
GS DOCUMENTS
#PRESIDENTIAL REPORTS

REPORTS
#PRESIDENTIAL REPORTS
CONGRESSIONAL REPORTS
PAPERS
RECORDS

RT
#PRESIDENTIAL REPORTS
CONGRESSIONAL REPORTS
PAPERS
RECORDS

PRESINTERING
USE SINTERING

PRESSES
1504
GS #PRESSES
.RAMS (PRESSES)
RT COMPACTING
HAMMERS
MACHINE TOOLS
PLATENS
% PRESSING
PRESSING (FORMING)
PUNCHES
TOOLS

% PRESSING
1504 1801
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT COLD PRESSING
COMPACTING
COMPRESSING
HOT ISOSTATIC PRESSING
HOT PRESSING
PLATENS
PRESSES
PRESSING (FORMING)

PRESSING (FORMING)
1504
GS FORMING TECHNIQUES
#PRESSING (FORMING)
..BLANKING (CUTTING)
..COINING
..STAMPING
RT COLD PRESSING
COMPACTING
EXTRUDING
FORGING
HOT ISOSTATIC PRESSING
HOT PRESSING
METAL WORKING
MOLDS
PRESSES
% PRESSING
PULTRUSION
SIZING (SHAPING)

```

# NASA THESAURUS HIERARCHICAL UPDATE

## UPSETTING

### PRESSORS

#### USE VASOCONSTRICTOR DRUGS

### PRESSURE

1202 1408 2003 2311 3408 3501

#### UF SURFACE PRESSURE

#### GS #PRESSURE

.ATMOSPHERIC PRESSURE

.BASE PRESSURE

.BLOOD PRESSURE

.DIASTOLIC PRESSURE

.HYPERTENSION

.HYPOTENSION

.LOWER BODY NEGATIVE PRESSURE

.SYSTOLIC PRESSURE

.CRITICAL PRESSURE

.DENSIFICATION

.DIFFERENTIAL PRESSURE

.DYNAMIC PRESSURE

.FLUID PRESSURE

.WATER PRESSURE

.GAS PRESSURE

.GEOPRESSURE

.HIGH PRESSURE

.INLET PRESSURE

.INTERNAL PRESSURE

.INTRACRANIAL PRESSURE

.INTRAOCULAR PRESSURE

.ISOSTATIC PRESSURE

.LOW PRESSURE

.HIGH ALTITUDE PRESSURE

.MIDDLE EAR PRESSURE

.OVERPRESSURE

.PARTIAL PRESSURE

.OXYGEN TENSION

.HYPOXEMIA

.PLASMA PRESSURE

.RADIATION PRESSURE

.ELECTRON PRESSURE

.LUMENS

.LUMINOUS INTENSITY

.ILLUMINANCE

.LUMINANCE

.SOUND PRESSURE

.STAGNATION PRESSURE

.STATIC PRESSURE

.HYDROSTATIC PRESSURE

.SUPERCRITICAL PRESSURES

.THRUST CHAMBER PRESSURE

.TRANSIENT PRESSURES

.TRANSITION PRESSURE

.VACUUM

.HIGH VACUUM

.LOW VACUUM

.ULTRAHIGH VACUUM

.VAPOR PRESSURE

.WALL PRESSURE

.WIND PRESSURE

.BARORECEPTORS

.BLAST LOADS

.CENTER OF PRESSURE

.COMPRESSING

.EAR PRESSURE TEST

.ELASTIC WAVES

.ENVIRONMENTS

% FORCE

FUEL TANK PRESSURIZATION

GIBBS-HELMHOLTZ EQUATIONS

HEAD (FLUID MECHANICS)

HIGH PRESSURE OXYGEN

IMPACT

ISOBAR (PRESSURE)

LOADS (FORCES)

NEWTON PRESSURE LAW

OSMOSIS

PRESSURE BREATHING

PRESSURE BROADENING

PRESSURE CHAMBERS

PRESSURE DISTRIBUTION

PRESSURE DRAG

PRESSURE DROP

PRESSURE EFFECTS

PRESSURE GAGES

PRESSURE GRADIENTS

PRESSURE HEADS

PRESSURE ICE

PRESSURE MEASUREMENT

PRESSURE MODULATOR RADIOMETERS

PRESSURE OSCILLATIONS

PRESSURE PULSES

PRESSURE RATIO

PRESSURE RECORDERS

PRESSURE RECOVERY

PRESSURE REDUCTION

PRESSURE SENSORS

PRESSURE SUITS

PRESSURE VESSEL DESIGN

PRESSURE VESSELS

PRESSURE WELDING

PRESSURIZED CABINS

PRESSURIZING

TEMPERATURE INVERSIONS

VACUUM CHAMBERS

WEIGHT (MASS)

PRESSURE BREATHING  
0303 0504

GS RESPIRATION

#PRESSURE BREATHING

RT EMERGENCY BREATHING TECHNIQUES

LIQUID BREATHING

PRESSURE

STRESS (PHYSIOLOGY)

PRESSURE BROADENING

1411 2401 2404

RT LINE SPECTRA

PRESSURE

SPECTROSCOPY

PRESSURE CABINS

USE PRESSURIZED CABINS

PRESSURE CHAMBERS

0303 0408 0504

GS COMPARTMENTS

.TEST CHAMBERS

.#PRESSURE CHAMBERS

...HYPERBARIC CHAMBERS

...VACUUM CHAMBERS

RT AIR LOCKS

% CHAMBERS

ENCLOSURES

PRESSURE

PRESSURIZED CABINS

WIND TUNNEL DRIVES

PRESSURE DEPENDENCE

1202

RT BURNING RATE

HYDROSTATIC PRESSURE

REACTION KINETICS

PRESSURE DISTRIBUTION

0101 0102 1203 3203 3501

UF PRESSURE FIELDS

GS DISTRIBUTION (PROPERTY)

#PRESSURE DISTRIBUTION

RT AERODYNAMIC COEFFICIENTS

AERODYNAMIC LOADS

AERODYNAMIC STABILITY

CENTER OF PRESSURE

DIFFERENTIAL PRESSURE

% DISTRIBUTION

FIELD THEORY (PHYSICS)

INFLUENCE COEFFICIENT

INTERNAL PRESSURE

ISOBAR (PRESSURE)

LIFT

LOADING MOMENTS

LOADS (FORCES)

MANOMETERS

MASS DISTRIBUTION  
MOMENT DISTRIBUTION  
NEWTON PRESSURE LAW  
PRESSURE  
% PRESSURE DROP  
SHOCK WAVE PROFILES  
SPANWISE BLOWING  
STATIC LOADS  
STRUCTURAL DESIGN CRITERIA  
THEODORSEN TRANSFORMATION  
THRUST DISTRIBUTION  
VELOCITY DISTRIBUTION  
VERTICAL DISTRIBUTION  
WALL PRESSURE

PRESSURE DRAG  
O101 1203 3501  
GS DYNAMIC CHARACTERISTICS  
. DRAG  
. #PRESSURE DRAG  
... SUPERSONIC DRAG  
... WAVE DRAG  
... INTERFERENCE DRAG  
RT AERODYNAMIC DRAG  
FRICTION DRAG  
PRESSURE

% PRESSURE DROP  
O408 1201 1202 1203  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT FLUID POWER  
FRICTION  
GAS FLOW  
HEAD FLOW  
INLET FLOW  
PRESSURE  
PRESSURE DISTRIBUTION  
PRESSURE GRADIENTS  
PRESSURE OSCILLATIONS  
PRESSURE REDUCTION  
TWO PHASE FLOW

PRESSURE EFFECTS  
O101 0408 1202 1203 3203  
RT BETA FACTOR  
% COMPRESSIBILITY EFFECTS  
JET BLAST EFFECTS  
LOADS (FORCES)  
NONISOTHERMAL PROCESSES  
PRESSURE  
SUCTION  
TEMPERATURE EFFECTS

TEMPERATURE INVERSIONS  
TRANSITION PRESSURE  
VACUUM EFFECTS  
WIND EFFECTS

PRESSURE FIELDS  
USE PRESSURE DISTRIBUTION

PRESSURE GAGES  
1202 1203 1408 3501  
UF BOMBS (PRESSURE GAGES)  
GS MEASURING INSTRUMENTS  
#PRESSURE GAGES  
.. BAROMETERS  
.. MANOMETERS  
.. OSMOMETERS  
.. PIEZOELECTRIC GAGES  
.. PIEZOMETERS  
.. VACUUM GAGES  
... IONIZATION GAGES  
... ALPHATRONS  
... BAYARD-ALPERT IONIZATION GAGES  
... PENNING GAGES  
... PHILIPS IONIZATION GAGES  
... KNUDSEN GAGES  
... MCLEOD GAGES  
... PIRANI GAGES  
RT % BOMBS  
BOURDON TUBES  
FLOWMETERS  
HYPSONOMETERS  
PRESSURE  
SHOCK MEASURING INSTRUMENTS  
STRAIN GAGE ACCELEROMETERS  
STRAIN GAGE BALANCES  
STRAIN GAGES  
WEIGHT INDICATORS

PRESSURE GRADIENTS  
1202 1203 1301 3408  
GS GRADIENTS  
#PRESSURE GRADIENTS  
RT ATMOSPHERIC PRESSURE  
BATHYTHERMOGRAPHS  
CRITICAL FLOW  
DIFFERENTIAL PRESSURE  
FLUID BOUNDARIES  
FLUID FLOW  
FRICTION FACTOR  
GEOPRESSURE  
HYDRODYNAMICS  
HYDROSTATICS  
INLET PRESSURE  
ISOBARS (PRESSURE)  
KNUDSEN FLOW

LIQUID FLOW  
LIQUID-LIQUID INTERFACES  
LIQUID-VAPOR INTERFACES  
MULTIPHASE FLOW  
ORIFICE FLOW  
PIPE FLOW  
POTENTIAL GRADIENTS  
PRESSURE  
% PRESSURE DROP  
RANKINE-HUGONIOT RELATION  
STEADY FLOW  
STEAM FLOW  
SUBCRITICAL FLOW  
SUCTION  
SUPERCRITICAL FLOW  
UNIFORM FLOW  
UNSTEADY FLOW  
VENTURI TUBES

PRESSURE HEADS  
1202 1203 1408 3501  
UF HEAD (PRESSURE)  
GS FLUID FLOW  
. HEAD (FLUID MECHANICS)  
. #PRESSURE HEADS  
RT CENTER OF PRESSURE  
ELEVATION  
% HYDRAULICS  
HYDRODYNAMICS  
HYDROSTATIC PRESSURE  
HYDROSTATICS  
LIQUID FLOW  
PRESSURE

PRESSURE ICE  
1310 2003  
UF PRESSURE RIDGES  
GS ICE  
. SEA ICE  
. #PRESSURE ICE  
RT COLD WEATHER  
FREEZING  
ICE FORMATION  
LOW TEMPERATURE  
OCEAN CURRENTS  
PRESSURE  
TIDES  
WIND (METEOROLOGY)  
WINTER

PRESSURE MEASUREMENT  
1202 1203 1408 3501  
UF TONOMETRY  
GS MECHANICAL MEASUREMENT  
#PRESSURE MEASUREMENT

[illegible]

PRESSURE TRANSDUCERS  
 USE PRESSURE SENSORS  
 PRESSURE VESSEL DESIGN  
 1103 1202 1203 1504 3404  
 GS STRUCTURAL DESIGN  
 #PRESSURE VESSEL DESIGN  
 RT % DESIGN  
 PERFORATED SHELLS  
 PRESSURE  
 SHELLS (STRUCTURAL FORMS)  
 PRESSURE VESSELS  
 1103 1504 3202  
 GS #PRESSURE VESSELS  
 .PREBURNERS  
 RT ACCUMULATORS  
 BELLS  
 BOILERS  
 BULBS  
 BURST TESTS  
 % CONTAINERS  
 DOMES (STRUCTURAL FORMS)  
 FUEL TANK PRESSURIZATION  
 FUEL TANKS  
 HEMISPHERE CYLINDER BODIES  
 ISOTENSOID STRUCTURES  
 PRESSURE  
 PROPELLANT TANKS  
 REACTOR MATERIALS  
 SHALLOW SHELL EQUATIONS  
 SPHERICAL TANKS  
 STORAGE TANKS  
 TANKS (CONTAINERS)  
 % VESSELS  
 WALL PRESSURE  
 WIND TUNNEL WALLS  
 PRESSURE WAVES  
 USE ELASTIC WAVES  
 PRESSURE WELDING  
 1203 1507  
 GS WELDING  
 #PRESSURE WELDING  
 ..COLD WELDING  
 ..DIFFUSION WELDING  
 ..EXPLOSIVE WELDING  
 ..FRICTION WELDING  
 ..ULTRASONIC WELDING  
 RT ARC WELDING  
 ELECTRIC WELDING  
 FLASH WELDING  
 FUSION WELDING  
 GAS WELDING  
 PRESSURE  
 SPOT WELDS  
 PRESSURIZED CABINS  
 0303 0401 0504 0506 0507  
 UF PRESSURE CABINS  
 GS COMPARTMENTS  
 #PRESSURIZED CABINS  
 RT AIRCRAFT COMPARTMENTS  
 CABIN ATMOSPHERES  
 % CABINS  
 COCKPITS  
 EMERGENCY LIFE SUSTAINING SYSTEMS  
 ENVIRONMENTAL CONTROL  
 ESCAPE CAPSULES  
 EXPLOSIVE DECOMPRESSION  
 LIFE SUPPORT SYSTEMS  
 OXYGEN SUPPLY EQUIPMENT  
 PRESSURE  
 PRESSURE CHAMBERS  
 SPACECRAFT CABIN ATMOSPHERES  
 SPACECRAFT CABINS  
 PRESSURIZED WATER REACTORS  
 2203 2204 3404  
 GS NUCLEAR REACTORS  
 .LIQUID COOLED REACTORS  
 ..WATER COOLED REACTORS  
 ..#PRESSURIZED WATER REACTORS  
 ....SPECTRAL SHIFT CONTROL REACTOR  
 RT NUCLEAR POWER REACTORS  
 PRESSURE  
 PRESSURIZING  
 0303 1202 1203 3404  
 GS #PRESSURIZING  
 .FUEL TANK PRESSURIZATION  
 RT ACCUMULATORS  
 DENSIFICATION  
 EXPULSION  
 EXPULSION BLADDERS  
 GAS GENERATORS  
 GAS INJECTION  
 INFLATING  
 PRESSURE  
 PRESSURE REGULATORS  
 STIMULATION  
 PRESTON TUBES  
 USE PITOT TUBES  
 SPEED INDICATORS  
 PRESTRAINING  
 PRESTRESSING  
 3110 3202  
 UF PRELOADING  
 PRESTRAINING  
 PRETWISTING  
 PREPARATION  
 .PRETREATMENT  
 .#PRESTRESSING  
 RT ELASTIC DEFORMATION  
 ISOTENSOID STRUCTURES  
 STRESSES  
 STRUCTURAL STRAIN  
 PRETESTS  
 USE TESTS  
 PRETREATMENT  
 3404 3407  
 GS PREPARATION  
 #PRETREATMENT  
 ..PRESTRESSING  
 RT PREVENTION  
 % PRIMING  
 PRETWISTING  
 USE PRESTRESSING  
 TWISTING  
 PREVAPORIZATION  
 1203  
 GS PHASE TRANSFORMATIONS  
 .VAPORIZING  
 .#PREVAPORIZATION  
 RT FLASHING (VAPORIZING)  
 GASES  
 VAPOR PHASES  
 VAPORS  
 VOLATILITY  
 PREVENTION  
 1505 3406 3407  
 GS #PREVENTION  
 .ACCIDENT PREVENTION  
 .CORROSION PREVENTION  
 .FIRE PREVENTION  
 .ICE PREVENTION  
 RT BLOCKING  
 ETIOLOGY  
 % INHIBITION  
 POLLUTION  
 PREEMPTING  
 PRETREATMENT  
 PROTECTION



# NASA THESAURUS HIERARCHICAL UPDATE

% REDUCTION  
% RESISTANCE  
RETARDING  
SABOTAGE  
SAFETY  
STOPPING

PREWHIRLING  
3407  
GS PREPARATION  
#PREWHIRLING

PREWHITENING  
3407  
GS PREPARATION  
#PREWHITENING  
RT COLOR  
% TREATMENT

PRIBRAM METEORITE  
3005  
GS CELESTIAL BODIES  
.METEORITES  
..STONY METEORITES  
...CHONDRITES  
...#PRIBRAM METEORITE  
RT BOLIDES  
METEOR TRAILS

PRIMARY BATTERIES  
0302 0904  
SN (NON-RECHARGEABLE BATTERIES)  
GS ELECTRIC GENERATORS  
.DIRECT POWER GENERATORS  
.#PRIMARY BATTERIES  
...ALKALINE BATTERIES  
...DRY CELLS  
...MAGNESIUM CELLS  
...NICKEL ZINC BATTERIES  
...METAL AIR BATTERIES  
...ZINC-OXYGEN BATTERIES  
...SODIUM SULFUR BATTERIES  
...THERMAL BATTERIES  
ELECTROCHEMICAL CELLS  
.ELECTRIC BATTERIES  
.#PRIMARY BATTERIES  
...ALKALINE BATTERIES  
...DRY CELLS  
...MAGNESIUM CELLS  
...NICKEL ZINC BATTERIES  
...METAL AIR BATTERIES  
...ZINC-OXYGEN BATTERIES  
...SODIUM SULFUR BATTERIES  
...THERMAL BATTERIES  
CHARGE EFFICIENCY  
RT

ELECTROLYTES  
NONAQUEOUS ELECTROLYTES  
STORAGE BATTERIES  
WET CELLS

PRIMARY COSMIC RAYS  
2901  
UF HEAVY COSMIC RAY PRIMARIES  
GS EXTRATERRESTRIAL RADIATION  
#PRIMARY COSMIC RAYS  
..SOLAR COSMIC RAYS  
IONIZING RADIATION  
.COSMIC RAYS  
.#PRIMARY COSMIC RAYS  
...SOLAR COSMIC RAYS  
PARTICLES  
.CORPUSCULAR RADIATION  
.#PRIMARY COSMIC RAYS  
...SOLAR COSMIC RAYS  
RT COSMIC RAY ALBEDO  
HEAVY NUCLEI  
SECONDARY COSMIC RAYS

PRIMATES  
0402  
GS ANIMALS  
.VERTEBRATES  
..MAMMALS  
...#PRIMATES  
....APES  
....CHIMPANZEES  
....BABOONS  
....HUMAN BEINGS  
....MONKEYS

% PRIMERS  
1802 3302  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT ENGINE PRIMERS  
PRIMERS (COATINGS)  
PRIMERS (EXPLOSIVES)

PRIMERS (COATINGS)  
1802  
GS COATINGS  
.PROTECTIVE COATINGS  
.#PRIMERS (COATINGS)  
RT DOPES  
FILLERS  
FINISHES  
LACQUERS  
METAL COATINGS  
PAINTS

% PRIMERS  
SPRAYED COATINGS  
SUBSTRATES  
VARNISHES

PRIMERS (EXPLOSIVES)  
3302  
GS EXPLOSIVE DEVICES  
.INITIATORS (EXPLOSIVES)  
.#PRIMERS (EXPLOSIVES)  
IGNITERS  
.INITIATORS (EXPLOSIVES)  
.#PRIMERS (EXPLOSIVES)  
CAPS (EXPLOSIVES)  
DETONATION  
DETONATORS  
EXPLODING WIRES  
PERCUSSION  
% PRIMERS  
SQUIBS

% PRIMING  
1504 1802 3302 3404  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT COATING  
COATINGS  
INITIATION  
PREPARATION  
PRETREATMENT  
STARTING

PRIMITIVE EARTH ATMOSPHERE  
0404 0603 1301 1308 3009  
GS EARTH ATMOSPHERE  
#PRIMITIVE EARTH ATMOSPHERE  
RT % ATMOSPHERES  
ATMOSPHERIC COMPOSITION  
ATMOSPHERIC ELECTRICITY  
ATMOSPHERIC MODELS  
EARTH PLANETARY STRUCTURE  
FREE ATMOSPHERE  
PLANETARY ATMOSPHERES

PRIMITIVE EQUATIONS  
1902 3501  
RT ATMOSPHERIC BOUNDARY LAYER  
CLIMATOLOGY  
% EQUATIONS  
EULER EQUATIONS OF MOTION  
FLUID DYNAMICS  
% MATHEMATICS  
PRINCE EDWARD ISLAND



# NASA THESAURUS HIERARCHICAL UPDATE

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                    | ..NORMAL DENSITY FUNCTIONS<br>..PEARSON DISTRIBUTIONS<br>..RAYLEIGH DISTRIBUTION<br>..WEIBULL DENSITY FUNCTIONS<br>BINOMIAL THEOREM<br>CENSORED DATA (MATHEMATICS)<br>CONTINUITY (MATHEMATICS)<br>DISCRETE FUNCTIONS<br>EVENTS<br>EXPECTANCY HYPOTHESIS<br>EXPONENTIAL FUNCTIONS<br>FAILURE ANALYSIS<br>GAS DENSITY<br>MILLS RATIO<br>QUANTILES                                                                                                                                                | ITERATION<br>KOLMOGOROV-SMIRNOV TEST<br>LIKELIHOOD RATIO<br>MARTINGALES<br>% MATHEMATICS<br>MAXWELL-BOLTZMANN DENSITY FUNCTION<br>MINKOWSKI SPACE<br>MONTE CARLO METHOD<br>OPERATIONS RESEARCH<br>OUTLIERS (STATISTICS)<br>PARAMETER IDENTIFICATION<br>POPULATION THEORY<br>QUALITY CONTROL<br>RANDOM ERRORS<br>RANDOM NOISE<br>RELIABILITY<br>SAMPLING<br>STATISTICAL ANALYSIS<br>STATISTICAL DISTRIBUTIONS<br>% STATISTICS<br>STIELTJES INTEGRAL<br>STOCHASTIC PROCESSES<br>SUBGROUPS<br>% THEORIES<br>SYSTEM IDENTIFICATION<br>TRANSITION PROBABILITIES<br>TRAVELING SALESMAN PROBLEM<br>UNIQUENESS THEOREM | PIONEER VENUS 1 SPACECRAFT<br>PIONEER VENUS 2 ENTRY PROBES<br>PIONEER VENUS 2 NIGHT PROBE<br>PIONEER VENUS 2 SPACECRAFT<br>PIONEER VENUS 2 TRANSPORTER BUS<br>PIONEER 8 SPACE PROBE<br>PIONEER 9 SPACE PROBE<br>PIONEER 10 SPACE PROBE<br>PIONEER 11 SPACE PROBE<br>RADIO PROBING<br>REMOTE SENSORS<br>SONDES<br>SPACE PROBES<br>TRANSDUCERS |
| PROBABILITY DISTRIBUTION FUNCTIONS<br>1902 1905<br>GS | FUNCTIONS (MATHEMATICS)<br>#PROBABILITY DISTRIBUTION FUNCTIONS<br>STATISTICAL ANALYSIS<br>#PROBABILITY DISTRIBUTION FUNCTIONS<br>STATISTICAL DISTRIBUTIONS<br>#PROBABILITY DISTRIBUTION FUNCTIONS<br>DISCRETE FUNCTIONS<br>GOODNESS OF FIT                                                                                                                                                                                                                                                     | PROBLEM SOLVING<br>O802 1902 3404 3406<br>GS #PROBLEM SOLVING<br>.ALTERNATING DIRECTION IMPLICIT METHODS<br>.ASYMPTOTIC METHODS<br>.ITERATIVE SOLUTION<br>.THEOREM PROVING<br>APPROXIMATION<br>BACKWARD DIFFERENCING<br>COMPUTATIONAL GRIDS<br>CRANK-NICHOLSON METHOD<br>DECISION MAKING<br>DINING PHILOSOPHERS PROBLEM<br>EXISTENCE THEOREMS<br>GROUP DYNAMICS<br>HOMOTROPY<br>HOUSEHOLDER TRANSFORMATIONS<br>ITERATION<br>LEARNING THEORY<br>MANAGEMENT<br>MAZE LEARNING<br>% METHODOLOGY<br>NEWTON METHODS<br>SIMPLEX METHOD<br>% SOLUTION                                                                  |                                                                                                                                                                                                                                                                                                                                              |
| PROBABILITY THEORY<br>1902 1905 4001<br>UF            | STATISTICAL PROBABILITY<br>APPLICATIONS OF MATHEMATICS<br>BINOMIAL THEOREM<br>BOREL SETS<br>COMBINATORIAL ANALYSIS<br>CONFIDENCE<br>% CONJUNCTION<br>CONSECUTIVE EVENTS<br>CONTINUUMS<br>CORRELATION<br>DECISION THEORY<br>DISTRIBUTION FUNCTIONS<br>DUFFING DIFFERENTIAL EQUATION<br>EINSTEIN EQUATIONS<br>ERGODIC PROCESS<br>ERROR ANALYSIS<br>EVENTS<br>EXTREMUM VALUES<br>FORECASTING<br>FUZZY SYSTEMS<br>GAME THEORY<br>GOODNESS OF FIT<br>% INDICATION<br>INFINITY<br>INFORMATION THEORY | PROBE METHOD (FORECASTING)<br>1905 3402 3404<br>GS FORECASTING<br>.TECHNOLOGICAL FORECASTING<br>.#PROBE METHOD (FORECASTING)<br>MANAGEMENT METHODS<br>#PROBE METHOD (FORECASTING)<br>DELPHI METHOD (FORECASTING)<br>ESTIMATING<br>% METHODOLOGY<br>OPERATIONS RESEARCH<br>PATTERN METHOD (FORECASTING)<br>PLANNING<br>PREDICTIONS<br>PROFILE METHOD (FORECASTING)<br>TECHNOLOGY ASSESSMENT                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                              |
| RT                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                              |
| % PROBES<br>1406 1409 1413 1504 3108<br>SN            | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                                                                                                                                                                                             | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | BOLZA PROBLEMS<br>BOUNDARY VALUE PROBLEMS<br>CAUCHY PROBLEM<br>CHAPMAN-FERRARO PROBLEM<br>DIRICHLET PROBLEM<br>FOUR BODY PROBLEM<br>ISOPERIMETRIC PROBLEM<br>MANY BODY PROBLEM                                                                                                                                                               |
| % PROBLEMS<br>1902 2311 3406<br>SN                    | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                              |

## NASA THESAURUS HIERARCHICAL UPDATE

MAYER PROBLEM  
 NEUMANN PROBLEM  
 OPERATIONAL PROBLEMS  
 POINCARE PROBLEM  
 PRELAUNCH PROBLEMS  
 THREE BODY PROBLEM  
 TRACKING PROBLEM  
 TRAVELING SALESMAN PROBLEM  
 TWO BODY PROBLEM

PROCEDURES  
3406

```

METHODS
PRACTICES
#PROCEDURES
.BOUNDARY INTEGRAL METHOD
.CREW PROCEDURES (INFLIGHT)
.CREW PROCEDURES (PREFLIGHT)
.FINITE ELEMENT METHOD
.FINITE VOLUME METHOD
.GLIMM METHOD
.OPTICAL CORRECTION PROCEDURE
.PANEL METHOD (FLUID DYNAMICS)
PROCUREMENT POLICY
SYSTEMS ANALYSIS

```

PROCEEDINGS  
USE CONF

CONGRESSIONAL REPORTS

PROCESS CONTROL (INDUSTRY)

| 3407   | COMPONENT RELIABILITY<br>CONTROL | PRODUCT DEVELOPMENT<br>QUALITY CONTROL<br>SAMPLING<br>SPECIFICATIONS |
|--------|----------------------------------|----------------------------------------------------------------------|
| PORT % |                                  |                                                                      |

## PROCESS HEAT

| 3407 | HEAT            |
|------|-----------------|
| SS   | #PROCESS HEAT   |
| RT   | HEAT GENERATION |

% PROCESSES

3407 (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
AUTOREGRESSIVE PROCESSES  
ISENTROPIC PROCESSES  
JET MEMBRANE PROCESS  
KRAFT PROCESS (WOODPULP)  
NONISENTROPICITY

NONISOTHERMAL PROCESSES  
ORNSTEIN-UHLENBECK PROCESS  
PRODUCT DEVELOPMENT  
QUALITY CONTROL  
SOL-GEL PROCESSES  
SPACE INDUSTRIALIZATION  
UMKLAPP PROCESS

% PROCESSING  
0802 3407

SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

# RT ASSOCIATIVE PROCESSING (COMPUTERS)

BATCH PROCESSING  
DATA PROCESSING  
FOOD PROCESSING  
IMAGE PROCESSING  
MANUFACTURING  
MATERIALS RECOVERY  
MESSAGE PROCESSING  
NUCLEAR FUEL REPROCESSING  
OPTICAL DATA PROCESSING  
PHOTOGRAPHIC PROCESSING  
PRODUCTION ENGINEERING  
RECYCLING  
REFINING  
RETORT PROCESSING  
SETTLING  
SIGNAL PROCESSING  
WET SPINNING

PROCESSORS (COMPUTERS)  
USE CENTRAL PROCESSING UNITS

## PROCUREMENT

3406 GS #PROCUREMENT .GOVERNMENT PROCUREMENT LEASING

PERCENTAGE OF CONTRACTS  
EQUIPMENT SPECIFICATIONS  
GOVERNMENT/INDUSTRY RELATIONS  
RECEIVING  
SERVICES  
SPECIFICATIONS  
SUBCONTRACTS

PROCUREMENT MANAGEMENT  
3402 3404 3406

MANAGEMENT  
#PROCUREMENT  
ALLOCATIONS  
BUDGETING  
% BUDGETS

1122

COMMODITIES  
FEDERAL BUDGETS  
FINANCIAL MANAGEMENT  
INVENTORY MANAGEMENT  
PRODUCTS  
SERVICES

## PROCUREMENT POLICY

3401 3402 3404 3406  
GS POLICIES

#PROCUREMENT POLICY  
 DECISIONS  
 MANAGEMENT  
 PROCEDURES  
 REGULATIONS  
 RULES

## PRODUCT DEVELOPMENT

1505 3404 3406 4001  
JF ENGINEERING DEVELOPMENT  
GGS #PRODUCT DEVELOPMENT  
RT .WEAPONS DEVELOPMENT  
AIRCRAFT DESIGN  
AIRCRAFT PRODUCTION  
AMPLIFIER DESIGN

# PROCEEDINGS

## USE CONFERENCES

CONGRESSIONAL REPORTS

PROCESS CONTROL (INDUSTRY)

| 3407 | COMPONENT RELIABILITY<br>CONTROL | PRODUCT DEVELOPMENT | QUALITY CONTROL | SAMPLING | SPECIFICATIONS |
|------|----------------------------------|---------------------|-----------------|----------|----------------|
| PORT | %                                |                     |                 |          |                |

## PROCESS HEAT

| 3407 | HEAT            |
|------|-----------------|
| SS   | #PROCESS HEAT   |
| RT   | HEAT GENERATION |

% PROCESSES

3407 (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
AUTOREGRESSIVE PROCESSES  
ISENTROPIC PROCESSES  
JET MEMBRANE PROCESS  
KRAFT PROCESS (WOODPULP)  
NONISENTROPICITY

1122

|  |                            |  |
|--|----------------------------|--|
|  | COMMODITIES                |  |
|  | FEDERAL BUDGETS            |  |
|  | FINANCIAL MANAGEMENT       |  |
|  | INVENTORY MANAGEMENT       |  |
|  | PRODUCTS                   |  |
|  | SERVICES                   |  |
|  |                            |  |
|  | PROCUREMENT POLICY         |  |
|  | 3401 3402 3404 3406        |  |
|  | GS POLICIES                |  |
|  | #PROCUREMENT POLICY        |  |
|  | RT DECISIONS               |  |
|  | MANAGEMENT                 |  |
|  | PROCEDURES                 |  |
|  | REGULATIONS                |  |
|  | RULES                      |  |
|  |                            |  |
|  | PRODUCT DEVELOPMENT        |  |
|  | 1505 3404 3406 4001        |  |
|  | UF ENGINEERING DEVELOPMENT |  |
|  | GS #PRODUCT DEVELOPMENT    |  |
|  | .WEAPONS DEVELOPMENT       |  |
|  | RT AIRCRAFT DESIGN         |  |
|  | AIRCRAFT PRODUCTION        |  |
|  | AMPLIFIER DESIGN           |  |
|  | ANTENNA DESIGN             |  |
|  | BREADBOARD MODELS          |  |
|  | COMMERCE                   |  |
|  | COMPUTER DESIGN            |  |
|  | CONSUMERS                  |  |
|  | % DESIGN                   |  |
|  | % DEVELOPMENT              |  |
|  | ENGINE DESIGN              |  |
|  | FUNCTIONAL DESIGN SPECIFIC |  |
|  | HELICOPTER DESIGN          |  |
|  | INVENTIONS                 |  |
|  | LENS DESIGN                |  |
|  | MANAGEMENT                 |  |
|  | MARKET RESEARCH            |  |
|  | MARKETING                  |  |
|  | PATENT APPLICATIONS        |  |
|  | PATENT POLICY              |  |
|  | PILOT PLANTS               |  |
|  | PROCESS CONTROL (INDUSTRY) |  |
|  | % PROCESSES                |  |
|  | % PRODUCTION               |  |
|  | PRODUCTION ENGINEERING     |  |
|  | QUALITY                    |  |
|  | QUALITY CONTROL            |  |
|  | REACTOR DESIGN             |  |
|  | RELIABILITY                |  |
|  | SATELLITE DESIGN           |  |
|  | SOLVENT REFINED COAL       |  |
|  | SPACE INDUSTRIALIZATION    |  |
|  | SPACECRAFT DESIGN          |  |

1122

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STANDARDIZATION<br>STRUCTURAL DESIGN                                                                                                                                                                                                                                                                                                                                                                                                                   | RT | AIRCRAFT PRODUCTION COSTS<br>EMPLOYEE RELATIONS<br>ESTIMATES<br>FABRICATION<br>INDUSTRIAL MANAGEMENT<br>MANUFACTURING<br>QUALITY CONTROL<br>RELIABILITY<br>RESOURCES<br>SAFETY MANAGEMENT<br>TOTAL QUALITY MANAGEMENT | QUALITY CONTROL<br>RESOURCE ALLOCATION<br>SERVICES<br>SPACE INDUSTRIALIZATION                                                                                                                                                                                                                                                                                                                                   |
| % PRODUCTION<br>3404 3407<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RT AIRCRAFT PRODUCTION<br>FOOD PRODUCTION (IN SPACE)<br>FUEL PRODUCTION<br>OUTPUT<br>PRODUCT DEVELOPMENT<br>PRODUCTION ENGINEERING<br>PRODUCTION PLANNING<br>RESERVES<br>TOOLS                                                                                                                                                                                                                                                                         |    |                                                                                                                                                                                                                       | PROFICIENCY<br>USE ABILITIES                                                                                                                                                                                                                                                                                                                                                                                    |
| PRODUCTION COSTS<br>3402<br>GS #PRODUCTION COSTS<br>.AIRCRAFT PRODUCTION COSTS<br>RT COST ANALYSIS<br>COST ESTIMATES<br>DESIGN TO COST<br>LIFE CYCLE COSTS<br>OPERATING COSTS                                                                                                                                                                                                                                                                          |    |                                                                                                                                                                                                                       | PROFILE METHOD (FORECASTING)<br>1905 3402 3404<br>GS FORECASTING<br>.TECHNOLOGICAL FORECASTING<br>.#PROFILE METHOD (FORECASTING)<br>MANAGEMENT METHODS<br>#PROFILE METHOD (FORECASTING)<br>RT DELPHI METHOD (FORECASTING)<br>ESTIMATING<br>% METHODOLOGY<br>OPERATIONS RESEARCH<br>PLANNING<br>PREDICTIONS<br>PROBE METHOD (FORECASTING)<br>TECHNOLOGY ASSESSMENT                                               |
| PRODUCTION ENGINEERING<br>1504 3404 4001<br>UF PRODUCTION METHODS<br>GS #PRODUCTION ENGINEERING<br>.PRODUCTION ENGINEERING<br>RT AIRCRAFT PRODUCTION<br>AIRCRAFT PRODUCTION COSTS<br>% CAPACITY<br>% ENGINEERING<br>HUMAN FACTORS ENGINEERING<br>LASER APPLICATIONS<br>MANAGEMENT<br>NUMERICAL CONTROL<br>% OPERATIONS<br>PLANNING<br>% PROCESSING<br>PRODUCT DEVELOPMENT<br>% PRODUCTION<br>PRODUCTIVITY<br>PRODUCTS<br>SCHEDULING<br>STANDARDIZATION |    |                                                                                                                                                                                                                       | % PROFILES<br>1407 1412 1902 3406<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT AIRFOIL PROFILES<br>ANGLES (GEOMETRY)<br>CURVATURE<br>DELINEATION<br>DISTRIBUTION (PROPERTY)<br>GEOMETRY<br>GRADIENTS<br>LINE SHAPE<br>PLANFORMS<br>PROFILOMETERS<br>SEARCH PROFILES<br>SHAPES<br>SHOCK WAVE PROFILES<br>SLOPES<br>STREAMLINING<br>TOPOGRAPHY<br>WIND PROFILES |
| PRODUCTION MANAGEMENT<br>3404 3406<br>GS MANAGEMENT<br>#PRODUCTION MANAGEMENT                                                                                                                                                                                                                                                                                                                                                                          |    |                                                                                                                                                                                                                       | PROFILOMETERS<br>1406 1704<br>GS MEASURING INSTRUMENTS<br>#PROFILOMETERS<br>RT % PROFILES<br>ROUGHNESS<br>SHAPES<br>SURFACE PROPERTIES                                                                                                                                                                                                                                                                          |

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SURFACE ROUGHNESS
PROGENY
  0404 0405
  RT CHILDREN
  REPRODUCTION (BIOLOGY)

PROGNOSIS
  0405 3406
  RT DIAGNOSIS

PROGNOZ SATELLITES
  3107
  GS ARTIFICIAL SATELLITES
  .SOVIET SATELLITES
  .#PROGNOZ SATELLITES

PROGRAM EVALUATION REVIEW TECHNIQUE
  USE PERT

PROGRAM MANAGEMENT
  USE PROJECT MANAGEMENT

PROGRAM RELIABILITY (COMPUTERS)
  USE SOFTWARE RELIABILITY

PROGRAM TREND LINE ANALYSIS
  0802 3405 3406
  RT CRITICAL PATH METHOD
  MANAGEMENT PLANNING
  PERT
  PROGRAMS
  PROJECT MANAGEMENT

PROGRAM VERIFICATION (COMPUTERS)
  0802
  RT CHECKOUT
  COMPUTER PROGRAMMING
  FILE MAINTENANCE (COMPUTERS)
  PROVING
  SOFTWARE RELIABILITY
  SOFTWARE TOOLS
  SYSTEMS ANALYSIS
  % TESTS

PROGRAMMABLE LOGIC DEVICES
  RT ARCHITECTURE (COMPUTERS)
  COMPUTER SYSTEMS DESIGN
  CONTROLLERS
  LOGIC CIRCUITS
  LOGIC DESIGN

PROGRAMMED INSTRUCTION
  0802
  GS #PROGRAMMED INSTRUCTION

% COMPUTER ASSISTED INSTRUCTION
  RT COMPILERS
  COMPUTER PROGRAMMING
  COMPUTER PROGRAMS

PROGRAMMERS
  0802 0803
  GS PERSONNEL
  #PROGRAMMERS
  RT CODERS
  COMPUTER PROGRAMMING
  FILE MAINTENANCE (COMPUTERS)

% PROGRAMMING
  0802 3404 3405 3406
  SN (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
  RT COMPUTER PROGRAMMING
  DYNAMIC PROGRAMMING
  FILE MAINTENANCE (COMPUTERS)
  LINEAR PROGRAMMING
  MATHEMATICAL PROGRAMMING
  MICROPROGRAMMING
  MULTIPROGRAMMING
  NONLINEAR PROGRAMMING
  QUADRATIC PROGRAMMING
  STRUCTURED PROGRAMMING

PROGRAMMING (SCHEDULING)
  3406
  GS #PROGRAMMING (SCHEDULING)
  .THRUST PROGRAMMING
  RT CRITICAL PATH METHOD
  % STEPS

PROGRAMMING ENVIRONMENTS
  0802 4001
  UF SEE (SOFTWARE ENGINEERING
  ENVIRONMENTS)
  SOFTWARE ENGINEERING ENVIRONMENTS
  RT COMPUTER PROGRAMMING
  COMPUTER PROGRAMS
  ENVIRONMENTS
  SOFTWARE ENGINEERING
  SOFTWARE TOOLS

PROGRAMMING LANGUAGES
  0802
  GS LANGUAGES
  #PROGRAMMING LANGUAGES
  .ALGOL
  .APL (PROGRAMMING LANGUAGE)
  .ASSEMBLY LANGUAGE
  .AUTOCODERS

...COMPASS (PROGRAMMING LANGUAGE)
...MAP (PROGRAMMING LANGUAGE)
...BASIC (PROGRAMMING LANGUAGE)
...COBOL
...COGO (PROGRAMMING LANGUAGE)
...CONTEXT FREE LANGUAGES
...FORTH (PROGRAMMING LANGUAGE)
...FORTRAN
...HAL/S (LANGUAGE)
...HIGH LEVEL LANGUAGES
...ADA (PROGRAMMING LANGUAGE)
...C (PROGRAMMING LANGUAGE)
...C++ (PROGRAMMING LANGUAGE)
...LISP (PROGRAMMING LANGUAGE)
...MACHINE ORIENTED LANGUAGES
...MARVS (PROGRAMMING LANGUAGE)
...NATURAL LANGUAGE (COMPUTERS)
...PASCAL (PROGRAMMING LANGUAGE)
...PL/1
...PROLOG (PROGRAMMING LANGUAGE)
  COMPUTER PROGRAMMING
  PREDICATE LOGIC
  STRUCTURED PROGRAMMING

PROGRAMS
  0802 3406 3409
  GS #PROGRAMS
  .ARMY-NAVY INSTRUMENTATION PROGRAM
  .COMSAT PROGRAM
  .DEFENSE PROGRAM
  .DOWNRANGE ANTIMISSILE MEASUREMENT
  PROGRAM
  .GLOBAL ATMOSPHERIC RESEARCH
  PROGRAM
  .GARP ATLANTIC TROPICAL EXPERIMENT
  .GULLIVER PROGRAM
  .INTERNATIONAL GEOSPHERE-BIOSPHERE
  PROGRAM
  .LUNAR PROGRAMS
  .APOLLO PROJECT
  .SURVEYOR PROJECT
  .NASA PROGRAMS
  .ACEE PROGRAM
  .ASSESS PROGRAM
  .ATLIT PROJECT
  .DAST PROGRAM
  .NASA SPACE PROGRAMS
  .APOLLO APPLICATIONS PROGRAM
  .APOLLO PROJECT
  .BIOASTRONAUTICAL ORBITAL SPACE
  SYSTEM
  .CENTAUR PROJECT
  .EARTH & OCEAN PHYSICS
  APPLICATIONS PROGRAM
  .EARTH RESOURCES PROGRAM

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# NASA THESAURUS HIERARCHICAL UPDATE

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...EARTH RESOURCES SURVEY PROGRAM
...SEASAT PROGRAM
...ECHO PROJECT
...GALILEO PROJECT
...GEMINI PROJECT
...HELIOS PROJECT
...JUPITER PROJECT
...MAGELLAN PROJECT (NASA)
...MARINER PROGRAM
...MARINER VENUS-MERCURY 1973
...MARINER-MERCURY 1973
...MARS 69 PROJECT
...MARS 71 PROJECT
...MERCURY PROJECT
...NATIONAL LAUNCH VEHICLE PROGRAM
...NEW MOONS PROJECT
...NIMBUS PROJECT
...OPEN PROJECT
...PIONEER PROJECT
...PROJECT SETI
...RANGER PROJECT
...AGENA B RANGER PROGRAM
...ROVER PROJECT
...SAIL PROJECT
...SATURN PROJECT
...SCOUT PROJECT
...SKYLAB PROGRAM
...STARPROBE MISSION
...SURVEYOR PROJECT
...SYNCHRONOUS COMMUNICATIONS
...SATELLITE PROJ
...TEKITE PROJECT
...TIROS PROJECT
...TITAN PROJECT
...VANGUARD PROJECT
...VIKING MARS PROGRAM
...VOYAGER PROJECT
...NATIONAL AEROSPACE PLANE PROGRAM
...QUIET ENGINE PROGRAM
...SUPERSONIC CRUISE AIRCRAFT
RESEARCH
...TACT PROGRAM
...TERMINAL CONFIGURED VEHICLE
PROGRAM
...TILT ROTOR RESEARCH AIRCRAFT
PROGRAM
...PANT PROGRAM
...PROJECTS
...ADVENT PROJECT
...AGRISTARS PROJECT
...ALARM PROJECT
...ALOUETTE PROJECT
...APOLLO PROJECT
...APOLLO SOYUZ TEST PROJECT
...ARGUS PROJECT

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...ASSET PROJECT
...ATLIT PROJECT
...BIG SHOT PROJECT
...BIOS PROJECT
...BUMBLEBEE PROJECT
...CENTAUR PROJECT
...DEFENDER PROJECT
...EARTH & OCEAN PHYSICS
APPLICATIONS PROGRAM
...ECHO PROJECT
...ECLIPSE PROJECT
...EXPERIMENTAL REFLECTOR ORBITAL
SHOT PROJ
...FIRE (CLIMATOLOGY)
...GALILEO PROJECT
...GEMINI PROJECT
...GEOSARI PROJECT
...HARVARD RADIO METEOR PROJECT
...HELIOS PROJECT
...ISCCP PROJECT
...JUPITER PROJECT
...MAGELLAN PROJECT (NASA)
...MARS 69 PROJECT
...MARS 71 PROJECT
...MERCURY PROJECT
...NEW MOONS PROJECT
...NIKE PROJECT
...NIMBUS PROJECT
...OPEN PROJECT
...PIONEER PROJECT
...PROJECT SETI
...RADIO ATTENUATION MEASUREMENT
PROJECT
...RAND PROJECT
...RANGER PROJECT
...AGENA B RANGER PROGRAM
...ROVER PROJECT
...SAIL PROJECT
...SATURN PROJECT
...SCANNER PROJECT
...SCOUT PROJECT
...SEAFARER PROJECT
...SQUID PROJECT
...SUBMARINE INTEGRATED CONTROL
PROJECT
...SUCCESS PROJECT
...SURVEYOR PROJECT
...SYNCHRONOUS COMMUNICATIONS
SATELLITE PROJ
...TELSTAR PROJECT
...THEMIS PROJECT
...TIROS PROJECT
...TITAN PROJECT
...VANGUARD PROJECT
...VOYAGER PROJECT

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...WEST FORD PROJECT
...RADAR TARGET SCATTER SITE PROGRAM
SPACE PROGRAMS
...ARGENTINE SPACE PROGRAM
...AUSTRALIAN SPACE PROGRAM
...BRAZILIAN SPACE PROGRAM
...CANADIAN SPACE PROGRAM
...ALOUETTE PROJECT
...CHINESE SPACE PROGRAM
...EUROPEAN SPACE PROGRAMS
...AUSTRIAN SPACE PROGRAM
...BELGIAN SPACE PROGRAM
...CZECHOSLOVAKIAN SPACE PROGRAM
...DANISH SPACE PROGRAM
...FINNISH SPACE PROGRAM
...FRENCH SPACE PROGRAM
...GERMAN SPACE PROGRAM
...GREEK SPACE PROGRAM
...HUNGARIAN SPACE PROGRAM
...ICELANDIC SPACE PROGRAM
...ITALIAN SPACE PROGRAM
...LUXEMBOURG SPACE PROGRAM
...NETHERLANDS SPACE PROGRAM
...NORWEGIAN SPACE PROGRAM
...PORTUGUESE SPACE PROGRAM
...SPANISH SPACE PROGRAM
...SWEDISH SPACE PROGRAM
...SWISS SPACE PROGRAM
...TURKISH SPACE PROGRAM
...U.S.S.R. SPACE PROGRAM
...UK SPACE PROGRAM
...GEOGRAPHIC APPLICATIONS PROGRAM
...INDIAN SPACE PROGRAM
...INDONESIAN SPACE PROGRAM
...ISRAELI SPACE PROGRAM
...JAPANESE SPACE PROGRAM
...MEXICAN SPACE PROGRAM
...NASA SPACE PROGRAMS
...APOLLO APPLICATIONS PROGRAM
...APOLLO PROJECT
...BIOASTRONAUTICAL ORBITAL SPACE
SYSTEM
...CENTAUR PROJECT
...EARTH & OCEAN PHYSICS
APPLICATIONS PROGRAM
...EARTH RESOURCES PROGRAM
...EARTH RESOURCES SURVEY PROGRAM
...SEASAT PROGRAM
...ECHO PROJECT
...GALILEO PROJECT
...GEMINI PROJECT
...HELIOS PROJECT
...JUPITER PROJECT
...MAGELLAN PROJECT (NASA)
...MARINER PROGRAM

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|                                        |                             |                                  |  |
|----------------------------------------|-----------------------------|----------------------------------|--|
| ....MARINER VENUS-MERCURY 1973         | 3406 3408                   | MATRIX MANAGEMENT                |  |
| ....MARINER-MERCURY 1973               | RT ECONOMOMICS              | % MISSIONS                       |  |
| ....MARS 69 PROJECT                    | MANAGEMENT                  | NASA INTERACTIVE PLANNING SYSTEM |  |
| ....MARS 71 PROJECT                    | PLANNING                    | OPERATIONS RESEARCH              |  |
| ....MERCURY PROJECT                    | % PROPERTIES                | PRIORITIES                       |  |
| ....NATIONAL LAUNCH VEHICLE PROGRAM    |                             | PROJECTS                         |  |
| ....NEW MOONS PROJECT                  | PROGRESSIONS                |                                  |  |
| ....NIMBUS PROJECT                     | 1902 1903                   | PROJECT SETI                     |  |
| ....OPEN PROJECT                       | GS ANALYSIS (MATHEMATICS)   | 3009                             |  |
| ....PIONEER PROJECT                    | .CALCULUS                   | UF SEARCH FOR EXTRATERRESTRIAL   |  |
| ....PROJECT SETI                       | ..SERIES (MATHEMATICS)      | INTELLIGENCE                     |  |
| ....RANGER PROJECT                     | ..#PROGRESSIONS             | SETI                             |  |
| ....AGENA B RANGER PROGRAM             | .REAL VARIABLES             | GS PROGRAMS                      |  |
| ....ROVER PROJECT                      | ..SERIES (MATHEMATICS)      | ..NASA SPACE PROGRAMS            |  |
| ....SAIL PROJECT                       | ..#PROGRESSIONS             | ..#PROJECT SETI                  |  |
| ....SATURN PROJECT                     | PROHIBITION                 | .PROJECTS                        |  |
| ....SCOUT PROJECT                      | 3403                        | ..#PROJECT SETI                  |  |
| ....SKYLAB PROGRAM                     | RT LEGAL LIABILITY          | .SPACE PROGRAMS                  |  |
| ....STARPROBE MISSION                  | PENALTIES                   | ..NASA SPACE PROGRAMS            |  |
| ....SURVEYOR PROJECT                   | POLICIES                    | ..#PROJECT SETI                  |  |
| ....SYNCHRONOUS COMMUNICATIONS         | REGULATIONS                 | EXTRATERRESTRIAL INTELLIGENCE    |  |
| ....SATELLITE PROJ                     |                             | RADIO COMMUNICATION              |  |
| ....TEKTITE PROJECT                    |                             | RADIO SIGNALS                    |  |
| ....TIROS PROJECT                      | PROJECT MANAGEMENT          |                                  |  |
| ....TITAN PROJECT                      | 3406 4001                   |                                  |  |
| ....VANGUARD PROJECT                   | UF PROGRAM MANAGEMENT       | PROJECTILE CRATERING             |  |
| ....VIKING MARS PROGRAM                | GS MANAGEMENT               | 3110 3201                        |  |
| ....VOYAGER PROJECT                    | #PROJECT MANAGEMENT         | UF HYPERVELOCITY CRATERING       |  |
| ....NEW ZEALAND SPACE PROGRAM          | COMMERCE                    | GS CRATERING                     |  |
| ....PAKISTAN SPACE PROGRAM             | CONTRACT MANAGEMENT         | #PROJECTILE CRATERING            |  |
| ....SAUDI ARABIAN SPACE PROGRAM        | CRITICAL PATH METHOD        | EJECTA                           |  |
| ....STARSITE PROGRAM                   | GERT                        | RT HYPERVELOCITY IMPACT          |  |
| ....TRAP PROGRAM                       | INTERFACES                  | HYPERVELOCITY PROJECTILES        |  |
| ....UNIVERSITY PROGRAM                 | MANAGEMENT PLANNING         | METEORITE CRATERS                |  |
| ....BUREAUS (ORGANIZATIONS)            | MANAGEMENT SYSTEMS          | METEORITIC DAMAGE                |  |
| ....COMMITTEE ON SPACE RESEARCH        | MISSION PLANNING            | METEOROID HAZARDS                |  |
| ....COMPUTER PROGRAM INTEGRITY         | PERT                        |                                  |  |
| ....COMPUTER PROGRAMS                  | PROGRAM TREND LINE ANALYSIS |                                  |  |
| ....EARTH RESOURCES INFORMATION SYSTEM | PROJECTS                    | PROJECTILE PENETRATION           |  |
| ....INVESTIGATION                      | RESEARCH AND DEVELOPMENT    | USE TERMINAL BALLISTICS          |  |
| ....MISSION PLANNING                   | % RESEARCH PROJECTS         |                                  |  |
| % MISSIONS                             | WEAPON SYSTEM MANAGEMENT    | PROJECTILES                      |  |
| % OPERATIONS                           |                             | 3101 3106 3108                   |  |
| PROGRAM TREND LINE ANALYSIS            | PROJECT PLANNING            | GS #PROJECTILES                  |  |
| RESEARCH AND DEVELOPMENT               | 3401 3404 3406 3409         | .HYPERVELOCITY PROJECTILES       |  |
| % RESEARCH PROJECTS                    | GS PLANNING                 | .PRECISION GUIDED PROJECTILES    |  |
| SEASAT SATELLITES                      | .MANAGEMENT PLANNING        | .SABOT PROJECTILES               |  |
| SEASAT 1                               | ..#PROJECT PLANNING         | RT AMMUNITION                    |  |
| SEASAT-B SATELLITE                     | ALLOCATIONS                 | BALLISTICS                       |  |
| SOLAR MAXIMUM MISSION                  | BUDGETING                   | BOMBS (ORDNANCE)                 |  |
| SYNCHRONOUS EARTH OBSERVATORY          | DECISIONS                   | CARTRIDGES                       |  |
| SATELLITE                              | ESTIMATES                   | FINNED BODIES                    |  |
| USER MANUALS (COMPUTER PROGRAMS)       | FORECASTING                 | GUNFIRE                          |  |
|                                        | GOALS                       | GUNS (ORDNANCE)                  |  |
|                                        | MANAGEMENT                  | INCENDIARY AMMUNITION            |  |
|                                        |                             | NUCLEAR WEAPONS                  |  |



# NASA THESAURUS HIERARCHICAL UPDATE

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PYROTECHNICS
  SHAPED CHARGES
  SHRAPNEL
  TERMINAL BALLISTICS
  TERRADYNAMICS
  WARHEADS
  WEAPONS

% PROJECTION
  O702 0804 1303 1902 2311 3406
  SN (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS
    LISTED BELOW)
  RT
    BONNE PROJECTION
    DESCRIPTIVE GEOMETRY
    DRAWINGS
    FORECASTING
    GNOMONIC PROJECTION
    GRAPHIC ARTS
    ILLUMINATING
    MAGNIFICATION
    PREDICTIONS
    PROJECTORS
    TRENDS

PROJECTIVE GEOMETRY
  1902
  GS
    GEOMETRY
    .EUCLIDEAN GEOMETRY
    .#PROJECTIVE GEOMETRY
    ...MERCATOR PROJECTION
  RT
    ANALYTIC GEOMETRY
    DESCRIPTIVE GEOMETRY
    GNOMONIC PROJECTION
    RECIPROCAL THEOREMS

PROJECTORS
  O202 0701 1101 1407 1412 2311
  SN (LIGHT AND IMAGE)
  RT
    BEACONS
    ILLUMINATING
    LUMINAIRES
    MOTION PICTURES
    PHOTOGRAMMETRY
    PHOTOGRAPHIC EQUIPMENT
    PHOTOGRAPHY
    PRINTERS
    % PROJECTION
    SEARCHLIGHTS

PROJECTS
  3406 3409
  GS
    PROGRAMS
    #PROJECTS
    ..ADVENT PROJECT
    ..AGRISTARS PROJECT
    ..ALARM PROJECT
    ..ALOUETTE PROJECT
    ..APOLLO PROJECT
    ..APOLLO SOYUZ TEST PROJECT
    ..ARGUS PROJECT
    ..ASSET PROJECT
    ..ATLIT PROJECT
    ..BIG SHOT PROJECT
    ..BIOS PROJECT
    ..BUMBLEBEE PROJECT
    ..CENTAUR PROJECT
    ..DEFENDER PROJECT
    ..EARTH & OCEAN PHYSICS
    APPLICATIONS PROGRAM
    ..ECHO PROJECT
    ..ECLIPSE PROJECT
    ..EXPERIMENTAL REFLECTOR ORBITAL
    SHOT PROJ
    ..FIRE (CLIMATOLOGY)
    ..GALILEO PROJECT
    ..GEMINI PROJECT
    ..GEOSARI PROJECT
    ..HARVARD RADIO METEOR PROJECT
    ..HELIOS PROJECT
    ..ISCCP PROJECT
    ..JUPITER PROJECT
    ..MAGELLAN PROJECT (NASA)
    ..MARS 69 PROJECT
    ..MARS 71 PROJECT
    ..MERCURY PROJECT
    ..NEW MOONS PROJECT
    ..NIKE PROJECT
    ..NIMBUS PROJECT
    ..OPEN PROJECT
    ..PIONEER PROJECT
    ..PROJECT SETI
    ..RADIO ATTENUATION MEASUREMENT
    PROJECT
    ..RAND PROJECT
    ..RANGER PROJECT
    ..AGENA B RANGER PROGRAM
    ..ROVER PROJECT
    ..SAIL PROJECT
    ..SATURN PROJECT
    ..SCANNER PROJECT
    ..SCOUT PROJECT
    ..SEAFARER PROJECT
    ..SQUID PROJECT
    ..SUBMARINE INTEGRATED CONTROL
    PROJECT
    ..SUCCESS PROJECT
    ..SURVEYOR PROJECT
    ..SYNCHRONOUS COMMUNICATIONS
    SATELLITE PROJ

    ..TELSTAR PROJECT
    ..THEMIS PROJECT
    ..TIROS PROJECT
    ..TITAN PROJECT
    ..VANGUARD PROJECT
    ..VOYAGER PROJECT
    ..WEST FORD PROJECT
    RT
      BUREAUS (ORGANIZATIONS)
      CONTRACTS
      ESTIMATING
      % MISSIONS
      % OPERATIONS
      PROJECT MANAGEMENT
      PROJECT PLANNING
      % RESEARCH PROJECTS
      TASKS
      TEAMS

    PROKARYOTES
      O404 0406 0409
      GS
        CELLS (BIOLOGY)
        #PROKARYOTES
      RT
        BACTERIA
        BIOLOGICAL EVOLUTION
        CYTOLOGY
        EUKARYOTES
        MOLECULAR BIOLOGY

    PROLATE SPHEROIDS
      1902 2402
      GS
        GEOMETRY
        .EUCLIDEAN GEOMETRY
        ..ANALYTIC GEOMETRY
        ...SPHEROIDS
        ...#PROLATE SPHEROIDS
      RT
        OBLATE SPHEROIDS

    PROLATENESS
      O101 0710 1202 1902 3203
      RT
        SHAPES

    PROLOG (PROGRAMMING LANGUAGE)
      O802
      GS
        LANGUAGES
        .PROGRAMMING LANGUAGES
        .#PROLOG (PROGRAMMING LANGUAGE)
      RT
        ARTIFICIAL INTELLIGENCE
        COMPUTER PROGRAMMING
        EXPERT SYSTEMS

    PROLONGATION
      3406 3407
      GS
        EXTENSIONS
        #PROLONGATION
      RT
        TIME
  
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PROMETHAZINE
1808
GS
  AMINES
  #PROMETHAZINE
  DRUGS
    .ANTIISTAMINICS
    .#PROMETHAZINE
  ORGANIC COMPOUNDS
    .CYCLIC COMPOUNDS
    .HETEROCYCLIC COMPOUNDS
    .#PROMETHAZINE

PROMETHIUM
1703 2406
GS
  CHEMICAL ELEMENTS
    .RARE EARTH ELEMENTS
    .#PROMETHIUM
    ...PROMETHIUM ISOTOPES
  METALS
    .RARE EARTH ELEMENTS
    .#PROMETHIUM
    ...PROMETHIUM ISOTOPES

PROMETHIUM ISOTOPES
1703 2406
UF
  PROMETHIUM 146
GS
  CHEMICAL ELEMENTS
    .NUCLIDES
    ..ISOTOPES
    ...PROMETHIUM ISOTOPES
    .RARE EARTH ELEMENTS
    ..PROMETHIUM
    ...PROMETHIUM ISOTOPES
  METALS
    .RARE EARTH ELEMENTS
    ..PROMETHIUM
    ...PROMETHIUM ISOTOPES

PROMETHIUM 146
  USE PROMETHIUM ISOTOPES

PROMINENCES
2902 3009
GS
  #PROMINENCES
  .SOLAR PROMINENCES
  RT
    SOLAR ACTIVITY

PROMOTION
3406 3407
RT
  DISPLAY DEVICES
  INCREASING
  PUBLIC RELATIONS
  UPGRADING

PRONE POSITION
0401 0502 0506
RT
  REST
  SITTING POSITION
  SUPINE POSITION

PRONY SERIES
0203 0208
GS
  ANALYSIS (MATHEMATICS)
  .CALCULUS
  ..SERIES (MATHEMATICS)
  ..#PRONY SERIES
  .REAL VARIABLES
  ..SERIES (MATHEMATICS)
  ..#PRONY SERIES

PROPS
  USE PROVING

PROP-FAN TECHNOLOGY
0202
UF
  PROPFAN TECHNOLOGY
  RT
    PROPELLER BLADES
    PROPELLER EFFICIENCY
    PROPELLER FANS
    TURBOPROP ENGINES

% PROPAGATION
0710 1704 2311 2601 2603 3407
SN
  (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
  UF
    PROPAGATORS
  RT
    ACOUSTIC PROPAGATION
    ATTENUATION
    CRACK PROPAGATION
    DIFFRACTION PROPAGATION
    DIFFUSION
    ELECTROMAGNETIC RADIATION
    FLAME PROPAGATION
    PROPAGATION (EXTENSION)
    SELF PROPAGATION
    STRESS PROPAGATION
    TRANSEQUATORIAL PROPAGATION
    TRANSMISSION
    WAVE PROPAGATION

PROPAGATION (EXTENSION)
2601 3407
GS
  #PROPAGATION (EXTENSION)
  .CRACK PROPAGATION
  .FLAME PROPAGATION
  RT
    % PROPAGATION

PROPAGATION MODES

PROPAGATION VELOCITY
0710 2402 3009
GS
  RATES (PER TIME)
  #PROPAGATION VELOCITY
  VELOCITY
  #PROPAGATION VELOCITY
  RT
    ELECTROMAGNETIC RADIATION
    GROUP VELOCITY
    PHASE VELOCITY
    PROPAGATION MODES
    WAVE PROPAGATION

PROPANE
1808 2702
GS
  ORGANIC COMPOUNDS
  .HYDROCARBONS
  ..ALIPHATIC HYDROCARBONS
  ...ALKANES
  ...#PROPANE
  RT
    CYCLOPROPANE
    HYDROCARBON FUELS
    NITROPROPANE

PROPARGYL GROUPS
0603
GS
  ORGANIC COMPOUNDS
  #PROPARGYL GROUPS
  RT
    ETHERS
    GETTERS
    PHENYLS

% PROPELLANT ACTUATED DEVICES
2802 3103 3110
SN
  (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)

```

|      |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT   | EJECTION SEATS<br>EXPLOSIVE DEVICES<br>PROPELLANT ACTUATED INSTRUMENTS<br>ROCKET ENGINES                                                                                                                                                                                                                    | THERMOCHEMISTRY                                                                                                                                                                                                                                                                 |
|      |                                                                                                                                                                                                                                                                                                             | .MASS RATIOS<br>.#PROPELLANT MASS RATIO<br>PAYLOAD MASS RATIO<br>PRESSURE RATIO<br>PROPULSION SYSTEM PERFORMANCE<br>PUSPUSIVE EFFICIENCY<br>SPECIFIC IMPULSE<br>STAGE SEPARATION                                                                                                |
|      | PROPELLANT ACTUATED INSTRUMENTS                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
| 2802 |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
| RT   | ACTUATORS<br>CONTROLLERS<br>% INSTRUMENTS<br>MEASURING INSTRUMENTS<br>% PROPELLANT ACTUATED DEVICES                                                                                                                                                                                                         | PROPELLANT OXIDIZERS<br>USE ROCKET OXIDIZERS                                                                                                                                                                                                                                    |
|      |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
|      | PROPELLANT ADDITIVES<br>2702 2804 3301<br>GS ADDITIVES<br>#PROPELLANT ADDITIVES<br>...PROPELLANT BINDERS<br>...SOLID ROCKET BINDERS<br>ANTIICING ADDITIVES                                                                                                                                                  | PROPELLANT PROPERTIES<br>2702 2804 2809 3301 3304<br>GS #PROPELLANT PROPERTIES<br>.PROPELLANT SENSITIVITY<br>.PROPELLANT STORABILITY<br>CHEMICAL PROPERTIES<br>ELASTIC PROPERTIES<br>MECHANICAL PROPERTIES<br>% PHYSICAL PROPERTIES<br>% PROPERTIES<br>THERMODYNAMIC PROPERTIES |
| RT   | ANTIOXIDANTS<br>CATALYSTS<br>COMPOSITE PROPELLANTS<br>CORROSION PREVENTION<br>GELLED PROPELLANTS<br>INHIBITORS<br>PLASTICIZERS<br>STORABLE PROPELLANTS                                                                                                                                                      | PROPELLANT SENSITIVITY<br>2702 2804 2809<br>GS PROPELLANT PROPERTIES<br>#PROPELLANT SENSITIVITY<br>SENSITIVITY<br>#PROPELLANT SENSITIVITY<br>IGNITION TEMPERATURE<br>IMPACT RESISTANCE<br>SHOCK RESISTANCE<br>SPONTANEOUS COMBUSTION<br>STORABLE PROPELLANTS                    |
|      |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
|      | PROPELLANT BINDERS<br>1808 2702 2804 2809<br>GS ADDITIVES<br>.PROPELLANT ADDITIVES<br>.#PROPELLANT BINDERS<br>...SOLID ROCKET BINDERS<br>BINDERS (MATERIALS)<br>#PROPELLANT BINDERS<br>..SOLID ROCKET BINDERS<br>COMPOSITE PROPELLANTS<br>GLYCIDYL AZIDE POLYMER<br>ROCKET PROPELLANTS<br>SOLID PROPELLANTS | PROPELLANT SPRAYS<br>2702 2804 2809 3301<br>RT FUEL INJECTION<br>FUEL SPRAYS<br>LIQUID INJECTION<br>LIQUID ROCKET PROPELLANTS<br>SPRAYS                                                                                                                                         |
|      |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
|      | PROPELLANT CASTING<br>1502 1504 1704<br>GS CASTINGS<br>#PROPELLANT CASTING<br>FORMING TECHNIQUES<br>.CASTING<br>.#PROPELLANT CASTING                                                                                                                                                                        | PROPELLANT STORABILITY<br>1103 2702 2804 2809<br>GS PROPELLANT PROPERTIES<br>#PROPELLANT STORABILITY<br>RT FUEL CORROSION<br>INHIBITORS<br>STORABLE PROPELLANTS                                                                                                                 |
|      |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                 |
|      | PROPELLANT CHEMISTRY<br>O602 1808<br>RT % CHEMISTRY<br>SOLID PROPELLANT COMBUSTION                                                                                                                                                                                                                          | PROPELLANT STORAGE<br>1103 2702 2804 2809<br>RT CONSUMABLES (SPACECRAFT)                                                                                                                                                                                                        |

|                                  |                                 |                             |
|----------------------------------|---------------------------------|-----------------------------|
| EXPULSION BLADDERS               | REFUELING                       |                             |
| FUEL TANK PRESSURIZATION         |                                 | CHEMICAL FUELS              |
| FUEL TANKS                       |                                 | % ENERGY SOURCES            |
| GROUND SUPPORT EQUIPMENT         | PROPELLANTS                     | EXPLOSIVES                  |
| HANDLING EQUIPMENT               | 2701 2702                       | FUEL TANKS                  |
| MISSILE STORAGE                  | GS #PROPELLANTS                 | FUELS                       |
| ROCKET PROPELLANTS               | .COLLOIDAL PROPELLANTS          | FULMINATES                  |
| SPACE STORAGE                    | .DOUBLE BASE PROPELLANTS        | GUNS (ORDNANCE)             |
| STORABLE PROPELLANTS             | .DOUBLE BASE ROCKET PROPELLANTS | INCENDIARY AMMUNITION       |
| % STORAGE                        | .GELLED PROPELLANTS             | % POWER SUPPLIES            |
| UNDERGROUND STORAGE              | .GELLED ROCKET PROPELLANTS      | PROPULSION                  |
|                                  | .GUN PROPELLANTS                | SPACECRAFT POWER SUPPLIES   |
|                                  | .HIGH ENERGY PROPELLANTS        | SPACECRAFT PROPULSION       |
| PROPELLANT TANKS                 | .DOMINO PROPELLANTS             | SPECIFIC IMPULSE            |
| 2702 2804 2806 2808 2809         | .HIGH TEMPERATURE PROPELLANTS   | TORPEDES                    |
| UF ROCKET PROPELLANT TANKS       | .HYBRID PROPELLANTS             |                             |
| GS TANKS (CONTAINERS)            | .HYDRAZINE NITROFORM            | PROPELLER BLADES            |
| #PROPELLANT TANKS                | .HYDROGEN AZIDES                | O104 O202                   |
| CYLINDRICAL TANKS                | .NITRASOL EXPLOSIVES            | GS AIRFOILS                 |
| EXPULSION BLADDERS               | .PENTOLITE                      | #PROPELLER BLADES           |
| EXTERNAL TANKS                   | .RDX                            | RT BLADE TIPS               |
| FLUID FILLED SHELLS              | .ROCKET PROPELLANTS             | % BLADES                    |
| FUEL TANK PRESSURIZATION         | .GASEOUS ROCKET PROPELLANTS     | FAN BLADES                  |
| FUEL TANKS                       | .LIQUID ROCKET PROPELLANTS      | FEATHERING                  |
| LIQUID FILLED SHELLS             | .CRYOGENIC ROCKET PROPELLANTS   | PROP-FAN TECHNOLOGY         |
| LIQUID PROPELLANT ROCKET ENGINES | .GELLED ROCKET PROPELLANTS      | PROPELLERS                  |
| LIQUID SLOSHING                  | .HYPERGOLIC ROCKET PROPELLANTS  | ROTARY WINGS                |
| PRESSURE VESSELS                 | .MONOPROPELLANTS                | SYNCHROPHASING              |
| SPHERICAL TANKS                  | .AEROZINE                       |                             |
| STORAGE TANKS                    | .RP-1 ROCKET PROPELLANTS        | PROPELLER DRIVE             |
| TANK GEOMETRY                    | .SLURRY PROPELLANTS             | O104 O201 2801              |
| ULLAGE                           | .SLUSH HYDROGEN                 | GS MECHANICAL DRIVES        |
|                                  | .NITRAMINE PROPELLANTS          | #PROPELLER DRIVE            |
| PROPELLANT TESTS                 | .SOLID ROCKET PROPELLANTS       | .HELICOPTER PROPELLER DRIVE |
| 2702 3404                        | .DOUBLE BASE ROCKET PROPELLANTS | CONTRAROTATING PROPELLERS   |
| RT COLD FLOW TESTS               | .METAL PROPELLANTS              | RT MARINE PROPULSION        |
| CORROSION TESTS                  | .TAGN                           | PROPELLERS                  |
| ENGINE TESTS                     | .TATB                           | UNDERWATER PROPULSION       |
| FUEL TESTS                       | .SOLID PROPELLANTS              |                             |
| INTERIOR BALLISTICS              | .CASE BONDED PROPELLANTS        | PROPELLER EFFICIENCY        |
| % MATERIALS TESTS                | .COMPOSITE PROPELLANTS          | O101 O104 O201              |
| MISSILE TESTS                    | .NITRAMINE PROPELLANTS          | GS EFFICIENCY               |
| PROPULSIVE EFFICIENCY            | .PLASTIC PROPELLANTS            | .PROPULSIVE EFFICIENCY      |
| STABILITY TESTS                  | .SOLID ROCKET PROPELLANTS       | .#PROPELLER EFFICIENCY      |
| % TESTS                          | .DOUBLE BASE ROCKET PROPELLANTS | CONTRAROTATING PROPELLERS   |
|                                  | .HMX                            | POWER EFFICIENCY            |
| PROPELLANT TRANSFER              | .HTPB PROPELLANTS               | PROP-FAN TECHNOLOGY         |
| 1103 2702 2806                   | .METAL PROPELLANTS              | PROPELLERS                  |
| GS FLUID FLOW                    | .STORABLE PROPELLANTS           |                             |
| .FUEL FLOW                       | .TETRYL                         | PROPELLER FANS              |
| .#PROPELLANT TRANSFER            | AMMUNITION                      | O202                        |
| MATERIALS HANDLING               | ASCENT PROPULSION SYSTEMS       | GS PROPELLERS               |
| #PROPELLANT TRANSFER             | AUXILIARY PROPULSION            | #PROPELLER FANS             |
| FUEL CONTROL                     | BALLISTICS                      | RT DUCTED FANS              |
| FUEL SYSTEMS                     | BURNING RATE                    | % FANS                      |
| LIQUID SLOSHING                  | CARTRIDGES                      | LIFT FANS                   |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                          |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PROP-FAN TECHNOLOGY                                                                                                                                                                                                                                                                                                                                                                                      | RT | ACUSTIC PROPERTIES<br>BIODEGRADABILITY<br>CHEMICAL PROPERTIES<br>CREEP PROPERTIES<br>DIELECTRIC PROPERTIES<br>DYNAMIC CHARACTERISTICS<br>ELECTRICAL PROPERTIES<br>ELECTROMAGNETIC PROPERTIES<br>HYGRAL PROPERTIES<br>MACROSCOPIC EQUATIONS<br>MAGNETIC PROPERTIES<br>% MATERIALS SCIENCE<br>MECHANICAL PROPERTIES<br>OPTICAL PROPERTIES<br>% PHYSICAL PROPERTIES<br>PLASTIC PROPERTIES<br>POROSITY<br>PREJUDICES<br>PROGRESS<br>PROPELLANT PROPERTIES<br>PROXIMITY<br>RECOVERABILITY<br>REGULARITY<br>SHEAR PROPERTIES<br>STRUCTURAL PROPERTIES (GEOLOGY)<br>SURFACE PROPERTIES<br>TENSILE PROPERTIES<br>THERMOCHEMICAL PROPERTIES<br>THERMODYNAMIC PROPERTIES<br>THERMOPHYSICAL PROPERTIES<br>TRANSPORT PROPERTIES<br>TURBIDITY<br>VIRTUAL PROPERTIES | RT | DISTRIBUTING RATIOS<br><br>PROPORTIONAL CONTROL<br>O104 O201 O202<br>GS AUTOMATIC CONTROL<br>#PROPORTIONAL CONTROL<br>RT % CONTROL<br>CONTROL EQUIPMENT<br>FEEDBACK CONTROL<br>OFF-ON CONTROL<br>SERVOCONTROL<br><br>PROPORTIONAL COUNTERS<br>1201 2403 2405 2903<br>GS IONIZATION CHAMBERS<br>#PROPORTIONAL COUNTERS<br>MEASURING INSTRUMENTS<br>.COUNTERS<br>..RADIATION COUNTERS<br>..#PROPORTIONAL COUNTERS<br>..RADIATION MEASURING INSTRUMENTS<br>..RADIATION COUNTERS<br>..#PROPORTIONAL COUNTERS<br>DOSIMETERS<br>GEIGER COUNTERS<br>NEUTRON COUNTERS<br><br>PROPORTIONAL LIMIT<br>3408<br>UF ELASTIC STRENGTH<br>GS MECHANICAL PROPERTIES<br>.ELASTIC PROPERTIES<br>..#PROPORTIONAL LIMIT<br>RANGE (EXTREMES)<br>#PROPORTIONAL LIMIT<br>CRITICAL LOADING<br>MODULUS OF ELASTICITY<br>STRESS-STRAIN DIAGRAMS<br><br>PROPOSALS<br>1106 3404 3405 3406 3409<br>RT CONTRACTS<br>COST ANALYSIS<br>REPORTS<br>RESEARCH AND DEVELOPMENT<br><br>PROPRIOCEPTION<br>O401 O405 O408<br>UF KINESTHESIS<br>GS PERCEPTION<br>.SENSORY PERCEPTION<br>..#PROPRIOCEPTION<br>...AUTOKINESIS<br>RT KINESTHESIA |
| PROPELLER NOISE<br>2801 2805<br>GS ELASTIC WAVES<br>.SOUND WAVES<br>..NOISE (SOUND)<br>...AERODYNAMIC NOISE<br>...#PROPELLER NOISE<br>...#AIRCRAFT NOISE<br>...#PROPELLER NOISE<br>ACUSTIC RETROFITTING<br>AEROACOUSTICS<br>BLADE SLAP NOISE<br>ENGINE NOISE<br>MUFFLERS<br>NOISE INTENSITY<br>NOISE MEASUREMENT<br>NOISE PREDICTION (AIRCRAFT)<br>NOISE REDUCTION<br>SOUND FIELDS<br>SOUND TRANSMISSION | RT | PROP-FAN TECHNOLOGY<br><br>PROPHYLAXIS<br>O405 O504<br>RT DISEASES<br>IMMUNOLOGY<br><br>PROPRIONIC ACID<br>O403 1808<br>GS ACIDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br>ORGANIC COMPOUNDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br><br>PROPORTION<br>1902 1905                                                                                                                                                                                                                                                                                                                                                                                                                                           | RT | USE PROP-FAN TECHNOLOGY<br><br>PROPHYLAXIS<br>O405 O504<br>RT DISEASES<br>IMMUNOLOGY<br><br>PROPRIONIC ACID<br>O403 1808<br>GS ACIDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br>ORGANIC COMPOUNDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br><br>PROPORTION<br>1902 1905                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| PROPELLER SLIPSTREAMS<br>O101 O102 O104<br>GS WAKES<br>.AIRCRAFT WAKES<br>..SLIPSTREAMS<br>..#PROPELLER SLIPSTREAMS<br>.TURBULENT WAKES<br>..SLIPSTREAMS<br>..#PROPELLER SLIPSTREAMS<br>INTERFERENCE DRAG                                                                                                                                                                                                | RT | PROP-FAN TECHNOLOGY<br><br>PROPHYLAXIS<br>O405 O504<br>RT DISEASES<br>IMMUNOLOGY<br><br>PROPRIONIC ACID<br>O403 1808<br>GS ACIDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br>ORGANIC COMPOUNDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br><br>PROPORTION<br>1902 1905                                                                                                                                                                                                                                                                                                                                                                                                                                           | RT | USE PROP-FAN TECHNOLOGY<br><br>PROPHYLAXIS<br>O405 O504<br>RT DISEASES<br>IMMUNOLOGY<br><br>PROPRIONIC ACID<br>O403 1808<br>GS ACIDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br>ORGANIC COMPOUNDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br><br>PROPORTION<br>1902 1905                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| PROPELLERS<br>O104 O202 1202 1504<br>GS #PROPELLERS<br>.CONTRAROTATING PROPELLERS<br>.PROPELLER FANS<br>.SHROUDED PROPELLERS<br>.TILTED PROPELLERS<br>.VARIABLE PITCH PROPELLERS<br>ACTUATOR DISKS<br>FEATHERING<br>PROPELLER BLADES<br>PROPELLER DRIVE<br>PROPELLER EFFICIENCY<br>SHIPS                                                                                                                 | RT | PROP-FAN TECHNOLOGY<br><br>PROPHYLAXIS<br>O405 O504<br>RT DISEASES<br>IMMUNOLOGY<br><br>PROPRIONIC ACID<br>O403 1808<br>GS ACIDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br>ORGANIC COMPOUNDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br><br>PROPORTION<br>1902 1905                                                                                                                                                                                                                                                                                                                                                                                                                                           | RT | USE PROP-FAN TECHNOLOGY<br><br>PROPHYLAXIS<br>O405 O504<br>RT DISEASES<br>IMMUNOLOGY<br><br>PROPRIONIC ACID<br>O403 1808<br>GS ACIDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br>ORGANIC COMPOUNDS<br>.CARBOXYLIC ACIDS<br>..FATTY ACIDS<br>..#PROPRIONIC ACID<br><br>PROPORTION<br>1902 1905                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| % PROPERTIES<br>3408<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                                                                            | UF | ATTRIBUTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RT | KINESTHESIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

.LIPIDS  
 ..STEROIDS  
 ..#PROSTAGLANDINS  
 SECRETIONS  
 .ENDOCRINE SECRETIONS  
 ..HORMONES  
 ..#PROSTAGLANDINS  
 RT BIOSYNTHESIS  
 PROSTATE GLAND  
  
 PROSTATE GLAND  
 O404 O408  
 GS ANATOMY  
 .GENITOURINARY SYSTEM  
 ..REPRODUCTIVE SYSTEMS  
 ...SEX GLANDS  
 ...#PROSTATE GLAND  
 .GLANDS (ANATOMY)  
 ..SEX GLANDS  
 ..#PROSTATE GLAND  
 RT BLADDER  
 PROSTAGLANDINS  
  
 PROSTHETIC DEVICES  
 O405 O408  
 GS MEDICAL EQUIPMENT  
 #PROSTHETIC DEVICES  
 ..ARTIFICIAL EARS  
 RT WALKING MACHINES  
  
 PROTAGACTINIUM  
 1703 2406  
 GS CHEMICAL ELEMENTS  
 #PROTAGACTINIUM  
 ..PROTAGACTINIUM ISOTOPES  
 METALS  
 #PROTAGACTINIUM  
 ..PROTAGACTINIUM ISOTOPES  
  
 PROTAGACTINIUM COMPOUNDS  
 O603 1804  
 GS #PROTAGACTINIUM COMPOUNDS  
 .PROTAGACTINIUM FLUORIDES  
 RT % CHEMICAL COMPOUNDS  
 % METAL COMPOUNDS  
  
 PROTAGACTINIUM FLUORIDES  
 O603 1804  
 GS HALOGEN COMPOUNDS  
 .FLUORINE COMPOUNDS  
 ..FLUORIDES  
 ...METAL FLUORIDES  
 ...#PROTAGACTINIUM FLUORIDES  
 PROTAGACTINIUM COMPOUNDS  
 #PROTAGACTINIUM FLUORIDES

PROTAGACTINIUM ISOTOPES  
 O603 1703 2406  
 UF PROTAGACTINIUM 234  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 ..ISOTOPES  
 ..#PROTAGACTINIUM ISOTOPES  
 .PROTAGACTINIUM  
 ..PROTAGACTINIUM ISOTOPES  
 METALS  
 .PROTAGACTINIUM  
 ..PROTAGACTINIUM ISOTOPES  
  
 PROTAGACTINIUM 234  
 USE PROTAGACTINIUM ISOTOPES  
  
 PROTEASE  
 O403 1808  
 GS BIOPOLYMERS  
 .PROTEINS  
 ..ENZYMES  
 ..#PROTEASE  
 ORGANIC COMPOUNDS  
 .PROTEINS  
 ..ENZYMES  
 ..#PROTEASE  
  
 PROTECTION  
 O502 O504 1504 3406 3407  
 GS #PROTECTION  
 .ACCELERATION PROTECTION  
 .CIRCUIT PROTECTION  
 .CORROSION PREVENTION  
 .ENVIRONMENT PROTECTION  
 .EYE PROTECTION  
 .METEOROID PROTECTION  
 .RADIATION PROTECTION  
 ..RADIATION SHIELDING  
 ...SOLAR RADIATION SHIELDING  
 .THERMAL PROTECTION  
 ACCIDENT PREVENTION  
 AIRPORT SECURITY  
 CIVIL DEFENSE  
 COATINGS  
 COUNTERMEASURES  
 FLYING EJECTION SEATS  
 HAZARDS  
 HOUSINGS  
 INSULATION  
 PREVENTION  
 PROTECTORS  
 % RESISTANCE  
 SAFETY  
 SAFETY DEVICES

SHIELDING  
 WARNING  
 WARNING SYSTEMS  
  
 PROTECTIVE CLOTHING  
 O401 O508  
 GS CLOTHING  
 #PROTECTIVE CLOTHING  
 ..HELMETS  
 ..PRESSURE SUITS  
 ...SPACE SUITS  
 ...EXTRAVEHICULAR MOBILITY UNITS  
 ..VAPOR BARRIER CLOTHING  
 RT ARMOR  
 CHEMICAL DEFENSE  
 COVERALLS  
 EMERGENCY LIFE SUSTAINING SYSTEMS  
 FLIGHT CLOTHING  
 GLOVES  
 GOGGLES  
 MASKS  
 SAFETY DEVICES  
 SHOES

PROTECTIVE COATINGS  
 1505 1802 3404  
 UF CERAMAL PROTECTIVE COATINGS  
 SPRAYED PROTECTIVE COATINGS  
 GS COATINGS  
 #PROTECTIVE COATINGS  
 ..ANODIC COATINGS  
 ..CERAMIC COATINGS  
 ..PRIMERS (COATINGS)  
 ..REFRACTORY COATINGS  
 RT ALKYD RESINS  
 ALUMINIDES  
 ANODIZING  
 CLADDING  
 % CONSTRUCTION MATERIALS  
 CORROSION  
 DESENSITIZING  
 ELECTROPLATING  
 ENCAPSULATING  
 FINISHES  
 GLASS COATINGS  
 GLAZES  
 GOLD COATINGS  
 INORGANIC COATINGS  
 LACQUERS  
 METAL COATINGS  
 NICKEL COATINGS  
 PAINTS  
 PLASTIC COATINGS  
 PLATING  
 RUBBER COATINGS

SPRAYED COATINGS  
SURFACE FINISHING  
TRANSGRANULAR CORROSION  
VARNISHES  
WATERPROOFING  
ZINC COATINGS

PROTECTORS

0508 1802

GS #PROTECTORS

RT #EAR PROTECTORS

% BUMPERS

% CONTAINERS

ENCLOSURES

FAIRINGS

HOUSINGS

PROTECTION

SAFETY DEVICES

% SCREENS

SHEATHS

SHIELDING

PROTEIN CRYSTAL GROWTH

0602 2601 2603

GS GROWTH

.CRYSTAL GROWTH

.#PROTEIN CRYSTAL GROWTH

PROTEIN SYNTHESIS

PROTEINS

SPACE PROCESSING

PROTEIN DENATURATION

USE BIOPOLYMER DENATURATION

PROTEIN METABOLISM

0403 0406 0505

GS METABOLISM

#PROTEIN METABOLISM

..LIPID METABOLISM

PROTEIN SYNTHESIS

SYNTHETIC FOOD

PROTEIN SYNTHESIS

0403

RT BIOLOGICAL EVOLUTION

CHEMICAL EVOLUTION

PROTEIN CRYSTAL GROWTH

PROTEIN METABOLISM

PROTEINOIDS

0403 1808

GS BIOPOLYMERS

.PROTEINS

.#PROTEINOIDS

ORGANIC COMPOUNDS

.PROTEINS  
.#PROTEINOIDS

PROTEINS

0403 0406 1808

GS BIOPOLYMERS

#PROTEINS

..ALBUMINS

..ASPARTATES

..CALMODULIN

..ELASTIN

..ENZYMES

..ALDOLASE

..AMIDASE

..CARBONIC ANHYDRASE

..CATALASE

..CHOLINESTERASE

..CYTOCHROMES

..HEXOKINASE

..LYSOZYME

..NUCLEASE

..OXIDASE

..PAPAIN

..PEPSIN

..PROTEASE

..THROMBIN

..TRYPSIN

..FIBRIN

..GLOBULINS

..FIBRINOGEN

..GAMMA GLOBULIN

..HEMOGLOBIN

..CARBOXYHEMOGLOBIN

..OXHEMOGLOBIN

..KERATINS

..LIPOPROTEINS

..MELANIN

..MYOGLOBIN

..PROTEINOIDS

..PROTHROMBIN

..PROTOPROTEINS

ORGANIC COMPOUNDS

#PROTEINS

..ALBUMINS

..ASPARTATES

..CALMODULIN

..ELASTIN

..ENZYMES

..ALDOLASE

..AMIDASE

..CARBONIC ANHYDRASE

..CATALASE

..CHOLINESTERASE

..CYTOCHROMES

..HEXOKINASE

...LYSOZYME  
...NUCLEASE  
...OXIDASE  
...PAPAIN  
...PEPSIN  
...PROTEASE  
...THROMBIN  
...TRYPSIN  
...FIBRIN  
...GLOBULINS  
...FIBRINOGEN  
...GAMMA GLOBULIN  
...HEMOGLOBIN  
...CARBOXYHEMOGLOBIN  
...OXYHEMOGLOBIN  
...KERATINS  
...LIPOPROTEINS  
...MELANIN  
...MYOGLOBIN  
...PROTEINOIDS  
...PROTHROMBIN  
...PROTOPROTEINS  
ADRENOCORTICOTROPIN (ACTH)  
ALANINE  
BIOPOLYMER DENATURATION  
COLLAGENS  
CYSTEAMINE  
CYSTEINE  
% FOOD  
MACROMOLECULES  
NUCLEIC ACIDS  
NUCLEOTIDES  
% NUTRIENTS  
PEPTIDES  
POLYNUCLEOTIDES  
POLYPEPTIDES  
PROTEIN CRYSTAL GROWTH  
PROTOPLASM  
SERUMS  
SYNTHETIC FOOD

RT

PROTHROMBIN

0403 1808

GS

BIOPOLYMERS

.PROTEINS

.#PROTHROMBIN

ORGANIC COMPOUNDS

.PROTEINS

.#PROTHROMBIN

THROMBIN

PROTIUM

USE LIGHT WATER

PROTOBIOLOGY



# NASA THESAURUS HIERARCHICAL UPDATE

|                                |                                   |                |                             |
|--------------------------------|-----------------------------------|----------------|-----------------------------|
| O403                           | O404                              | PLASMA DENSITY | PROTON PRECESSION           |
| RT                             | ABIOTGENESIS                      | SPACE DENSITY  | 2403 2502                   |
| %                              | BIOLOGICAL EVOLUTION              |                | GS                          |
|                                | % BIOLOGY                         | PROTON ENERGY  | .GYRATION                   |
|                                | CHEMICAL EVOLUTION                | 2403 2405      | .PRECEDION                  |
|                                | PALEONTOLOGY                      | GS             | #PROTON PRECESSION          |
|                                | VIRUSES                           | RT             | FREE VIBRATION              |
| PROTOCOL (COMPUTERS)           |                                   |                |                             |
| O802                           |                                   |                | PROTON PRECIPITATION        |
| RT                             | CHANNELS (DATA TRANSMISSION)      | 2401 2403      | 2401 2403                   |
|                                | COMMUNICATION NETWORKS            | GS             | PARTICLE PRECIPITATION      |
|                                | COMPUTER NETWORKS                 | RT             | #PROTON PRECIPITATION       |
|                                | DATA LINKS                        |                | AURORAS                     |
|                                | DATA PROCESSING                   |                | ELECTRON PRECIPITATION      |
|                                | DATA TRANSMISSION                 |                | PARTICLES                   |
|                                | LOCAL AREA NETWORKS               |                | % PRECIPITATION             |
|                                | PACKET SWITCHING                  | SN             | RADIATION BELTS             |
|                                |                                   | GS             | TRAPPED PARTICLES           |
|                                |                                   |                | UPPER ATMOSPHERE            |
| PROTON BEAMS                   |                                   |                |                             |
| 2403 2405                      |                                   |                | PROTON PROTUBERANCES        |
| GS                             | BEAMS (RADIATION)                 | 2403           | 2403                        |
|                                | .PARTICLE BEAMS                   | GS             | PROTUBERANCES               |
|                                | .#PROTON BEAMS                    |                | #PROTON PROTUBERANCES       |
| RT                             | NEUTRON BEAMS                     |                |                             |
|                                |                                   |                | PROTON RESONANCE            |
| PROTON BELTS                   |                                   |                | 2307 2403 2404 2405         |
| 1302 2403 2903                 |                                   |                | GS                          |
| GS                             | PARTICLES                         |                | RESONANCE                   |
|                                | .CHARGED PARTICLES                |                | .MAGNETIC RESONANCE         |
|                                | .MAGNETICALLY TRAPPED PARTICLES   |                | .NUCLEAR MAGNETIC RESONANCE |
|                                | .RADIATION BELTS                  |                | .#PROTON RESONANCE          |
|                                | .#PROTON BELTS                    |                | RT                          |
|                                | .TRAPPED PARTICLES                |                | NUCLEAR PARTICLES           |
|                                | .MAGNETICALLY TRAPPED PARTICLES   |                |                             |
|                                | .RADIATION BELTS                  |                | PROTON SATELLITES           |
|                                | .#PROTON BELTS                    |                | 3107                        |
| RT % BELTS                     |                                   |                | GS                          |
| INNER RADIATION BELT           |                                   |                | ARTIFICIAL SATELLITES       |
| OUTER RADIATION BELT           |                                   |                | .SOVIET SATELLITES          |
|                                |                                   |                | .#PROTON SATELLITES         |
|                                |                                   |                | .PROTON 1 SATELLITE         |
|                                |                                   |                | .PROTON 2 SATELLITE         |
|                                |                                   |                | .PROTON 3 SATELLITE         |
|                                |                                   |                | .PROTON 4 SATELLITE         |
|                                |                                   |                | U.S.S.R. SPACE PROGRAM      |
| PROTON DAMAGE                  |                                   |                |                             |
| 2401 2403                      |                                   |                | PROTON SCATTERING           |
| GS                             | DAMAGE                            |                | 2403 2405                   |
|                                | #PROTON DAMAGE                    |                | GS                          |
|                                |                                   |                | NUCLEAR REACTIONS           |
| PROTON DENSITY (CONCENTRATION) |                                   |                | #PROTON SCATTERING          |
| 2403 2903                      |                                   |                | SCATTERING                  |
| GS                             | DENSITY (NUMBER/VOLUME)           |                | #PROTON SCATTERING          |
|                                | .PARTICLE DENSITY (CONCENTRATION) |                | ION SCATTERING              |
|                                | .ION DENSITY (CONCENTRATION)      |                |                             |
|                                | .#PROTON DENSITY (CONCENTRATION)  |                | PROTON TELESCOPES           |
|                                | .MAGNETOSPHERIC PROTON DENSITY    |                | USE                         |
| RT                             | ATMOSPHERIC DENSITY               |                | PARTICLE TELESCOPES         |
|                                | ATOM CONCENTRATION                |                |                             |

PROTON 1 SATELLITE  
 3107  
 GS  
 ARTIFICIAL SATELLITES  
 .SOVIET SATELLITES  
 ..PROTON SATELLITES  
 ..#PROTON 1 SATELLITE

PROTON 2 SATELLITE  
 3107  
 GS  
 ARTIFICIAL SATELLITES  
 .SOVIET SATELLITES  
 ..PROTON SATELLITES  
 ..#PROTON 2 SATELLITE

PROTON 3 SATELLITE  
 3107  
 GS  
 ARTIFICIAL SATELLITES  
 .SOVIET SATELLITES  
 ..PROTON SATELLITES  
 ..#PROTON 3 SATELLITE

PROTON 4 SATELLITE  
 3107  
 GS  
 ARTIFICIAL SATELLITES  
 .SOVIET SATELLITES  
 ..PROTON SATELLITES  
 ..#PROTON 4 SATELLITE

PROTON-PROTON REACTIONS  
 2403 2405 2902  
 GS  
 NUCLEAR REACTIONS  
 #PROTON-PROTON REACTIONS  
 RT  
 ANNIHILATION REACTIONS  
 %  
 INTERACTIONS  
 POMERONS  
 THERMONUCLEAR REACTIONS

PROTONS  
 2401 2403 2404 3009  
 GS  
 PARTICLES  
 .CHARGED PARTICLES  
 .#PROTONS  
 ...RECOIL PROTONS  
 ...SOLAR PROTONS  
 .ELEMENTARY PARTICLES  
 ..FERMIONS  
 ..#PROTONS  
 ....RECOIL PROTONS  
 ....SOLAR PROTONS  
 ALPHA PARTICLES  
 ANTI-PROTONS  
 BARYONS  
 COSMIC RAYS  
 DEUTERONS  
 FLUX DENSITY

HYDROGEN IONS  
 IONS  
 NUCLEAR PARTICLES  
 NUCLEI (NUCLEAR PHYSICS)  
 NUCLEON POTENTIAL  
 NUCLEONS  
 POSITIVE IONS  
 RADIATION BELTS  
 RADIATION SHIELDING  
 TRITONS

PROTOPLANETS  
 3001  
 UF  
 GS  
 PLANETESIMALS  
 CELESTIAL BODIES  
 #PROTOPLANETS  
 RT  
 COSMOLOGY  
 PLANETARY ENVIRONMENTS  
 PLANETARY EVOLUTION  
 PLANETARY MASS  
 PLANETS  
 SOLAR ORBITS  
 SOLAR SYSTEM  
 STELLAR EVOLUTION

PROTOPLASM  
 0404 0406  
 RT  
 PROTEINS

PROTOPLASTS  
 0404 0406  
 GS  
 CELLS (BIOLOGY)  
 #PROTOPLASTS

PROTOPROTEINS  
 0403 1808  
 GS  
 BIOPOLYMERS  
 .PROTEINS  
 .#PROTOPROTEINS  
 ORGANIC COMPOUNDS  
 .PROTEINS  
 .#PROTOPROTEINS  
 RT  
 AMINO ACIDS

PROTOSTARS  
 3001 3003  
 GS  
 CELESTIAL BODIES  
 .STARS  
 .#PROTOSTARS  
 ...PRE-MAIN SEQUENCE STARS  
 ....T TAURI STARS  
 BROWN DWARF STARS  
 STAR FORMATION  
 STELLAR EVOLUTION  
 STELLAR MASS ACCRETION

PROTOTYPES  
 0201 3110  
 RT  
 BREADBOARD MODELS  
 % PATTERNS  
 PILOT PLANTS

PROTOZOA  
 0402 0407  
 GS  
 ANIMALS  
 #PROTOZOA  
 ..AMOEBA  
 ...PELOMYXA  
 ..FLAGELLATA  
 ...EUGLENA  
 ...TRYPANOSOME  
 ..PARAMECIA  
 MICROORGANISMS  
 #PROTOZOA  
 ..AMOEBA  
 ...PELOMYXA  
 ..FLAGELLATA  
 ...EUGLENA  
 ...TRYPANOSOME  
 ..PARAMECIA  
 RT  
 MICROSPORES  
 SPORES

PROTRACTORS  
 1406 1902  
 GS  
 MEASURING INSTRUMENTS  
 #PROTRACTORS  
 RT  
 ANGLES (GEOMETRY)

PROTUBERANCES  
 0102 0202 3110  
 SN  
 (COMPONENTS MOUNTED EXTERNAL TO  
 THE STRUCTURE)  
 GS  
 #PROTUBERANCES  
 .PROTON PROTUBERANCES  
 RT  
 AERODYNAMIC CONFIGURATIONS  
 AERODYNAMIC INTERFERENCE  
 AIRCRAFT ANTENNAS  
 AIRCRAFT PARTS  
 AIRFRAMES  
 %  
 BLISTERS  
 COWLINGS  
 DOMES (STRUCTURAL FORMS)  
 EXTERNAL STORE SEPARATION  
 EXTERNAL STORES  
 FAIRINGS  
 FUEL TANKS  
 HOUSINGS  
 NACELLES  
 PAPILLAE

[illegible]

|                               |    |                     |                                    |
|-------------------------------|----|---------------------|------------------------------------|
| TAYLOR MANIFEST ANXIETY SCALE | RT | BIOFEEDBACK         | O405                               |
| PSYCHOLOGICAL FACTORS         |    | BOREDOM             | GS                                 |
| O408 O410                     |    | BRAIN               | PHARMACOLOGY                       |
| RT ASTRONAUT PERFORMANCE      |    | CYBERNETICS         | #PSYCHOPHARMACOLOGY                |
| AVIATION PSYCHOLOGY           |    | DETACHMENT          | RT                                 |
| EMOTIONAL FACTORS             |    | DIAGNOSIS           | CENTRAL NERVOUS SYSTEM             |
| FLIGHT STRESS (BIOLOGY)       |    | DISORDERS           | CENTRAL NERVOUS SYSTEM DEPRESSANTS |
| HABITS                        |    | DISORIENTATION      | CENTRAL NERVOUS SYSTEM STIMULANTS  |
| MOODS                         |    | EMOTIONAL FACTORS   | DRUGS                              |
| PERMISSIVITY                  |    | EMOTIONS            | LIFE SCIENCES                      |
| PSYCHOACOUSTICS               |    | EXTROVERSION        | MEDICAL SCIENCE                    |
| PSYCHOSOMATICS                |    | FRUSTRATION         | % MEDICINE                         |
| REWARD (PSYCHOLOGY)           |    | INSPIRATION         | NERVOUS SYSTEM                     |
| SEX FACTOR                    |    | INTELLECT           | PSYCHOTROPIC DRUGS                 |
| SPACE PSYCHOLOGY              |    | INTROVERSION        |                                    |
| % STIMULI                     |    | MORALE              | PSYCHOPHYSICS                      |
| STRESS (PSYCHOLOGY)           |    | PREJUDICES          | O408 2311                          |
|                               |    | PSYCHIATRY          | GS                                 |
|                               |    | PSYCHOMETRICS       | PSYCHOLOGY                         |
|                               |    | PSYCHOTHERAPY       | #PSYCHOPHYSICS                     |
|                               |    | RORSCHACH TESTS     | ..PSYCHOACOUSTICS                  |
|                               |    | STRESS (PSYCHOLOGY) | RT % PHYSICS                       |
|                               |    | SUBLIMINAL STIMULI  | PSYCHOMETRICS                      |
|                               |    |                     | % SCIENCE                          |
| PSYCHOLOGICAL INDEXES         |    |                     |                                    |
| USE PSYCHOLOGICAL TESTS       |    |                     |                                    |
| PSYCHOLOGICAL SETS            |    |                     |                                    |
| O408 O410                     |    |                     | PSYCHOPHYSIOLOGY                   |
| GS                            |    |                     | O401 O405 O408                     |
| #PSYCHOLOGICAL SETS           |    |                     | GS                                 |
|                               |    |                     | PHYSIOLOGY                         |
|                               |    |                     | #PSYCHOPHYSIOLOGY                  |
| PSYCHOLOGICAL TESTS           |    |                     | RT                                 |
| O408 O410 O502 1905           |    |                     | EVOKED RESPONSE (PSYCHOPHYSIOLOGY) |
| UF PSYCHOLOGICAL INDEXES      |    |                     | INFORMATION PROCESSING (BIOLOGY)   |
| GS #PSYCHOLOGICAL TESTS       |    |                     | % SCIENCE                          |
| .RORSCHACH TESTS              |    |                     | WORKLOADS (PSYCHOPHYSIOLOGY)       |
| CERTIFICATION                 |    |                     |                                    |
| ENVIRONMENTAL TESTS           |    |                     | PSYCHOSES                          |
| INTELLIGENCE TESTS            |    |                     | O408 O410                          |
| LIMEN                         |    |                     | GS                                 |
| MILITARY PSYCHOLOGY           |    |                     | #PSYCHOSES                         |
| PERSONALITY TESTS             |    |                     | .PSYCHOTIC DEPRESSION              |
| PILOT SELECTION               |    |                     | .SCHIZOPHRENIA                     |
| PSYCHOMETRICS                 |    |                     | RT                                 |
| RATIOS                        |    |                     | DETACHMENT                         |
| SKINNER BOXES                 |    |                     | DISORDERS                          |
| TAYLOR MANIFEST ANXIETY SCALE |    |                     | FEAR                               |
| % TESTS                       |    |                     | IRRATIONALITY                      |
|                               |    |                     | NEUROSES                           |
| PSYCHOLOGY                    |    |                     |                                    |
| O408 O410                     |    |                     | PSYCHOSOMATICS                     |
| GS #PSYCHOLOGY                |    |                     | O401 O405 O408 O410                |
| .AVIATION PSYCHOLOGY          |    |                     | GS                                 |
| .COGNITIVE PSYCHOLOGY         |    |                     | SENSORIMOTOR PERFORMANCE           |
| .MILITARY PSYCHOLOGY          |    |                     | .PSYCHOMOTOR PERFORMANCE           |
| .PSYCHOLOGICAL SETS           |    |                     | .#PSYCHOSOMATICS                   |
| .PSYCHOPHYSICS                |    |                     | RT                                 |
| ..PSYCHOACOUSTICS             |    |                     | PSYCHOLOGICAL FACTORS              |
| .SPACE PSYCHOLOGY             |    |                     | PSYCHOMETRICS                      |
|                               |    |                     |                                    |
|                               |    |                     | PSYCHOTHERAPY                      |
|                               |    |                     | O405 O408 O410                     |
|                               |    |                     | GS                                 |
|                               |    |                     | THERAPY                            |
|                               |    |                     | #PSYCHOTHERAPY                     |
|                               |    |                     | RT                                 |
|                               |    |                     | CONVULSIONS                        |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                           |  |  |  |
|-------------------------------------------|--|--|--|
| GESTALT THEORY                            |  |  |  |
| HEALTH                                    |  |  |  |
| MENTAL HEALTH                             |  |  |  |
| NEUROPSYCHIATRY                           |  |  |  |
| PSYCHIATRY                                |  |  |  |
| PSYCHOLOGY                                |  |  |  |
| PSYCHOTROPIC DRUGS                        |  |  |  |
| PSYCHOTIC DEPRESSION                      |  |  |  |
| 0408 0410                                 |  |  |  |
| GS PSYCHOSES                              |  |  |  |
| #PSYCHOTIC DEPRESSION                     |  |  |  |
| RT % DEPRESSION                           |  |  |  |
| NEUROTIC DEPRESSION                       |  |  |  |
| PSYCHOTROPIC DRUGS                        |  |  |  |
| 0405                                      |  |  |  |
| GS DRUGS                                  |  |  |  |
| #PSYCHOTROPIC DRUGS                       |  |  |  |
| ..MARIJUANA                               |  |  |  |
| RT CENTRAL NERVOUS SYSTEM                 |  |  |  |
| NARCOTICS                                 |  |  |  |
| NEUROPHYSIOLOGY                           |  |  |  |
| PHYSIOCHEMISTRY                           |  |  |  |
| PSYCHOPHARMACOLOGY                        |  |  |  |
| PSYCHOTHERAPY                             |  |  |  |
| SEDATIVES                                 |  |  |  |
| PSYCHROMETERS                             |  |  |  |
| 1301 1408 2001 2003                       |  |  |  |
| GS MEASURING INSTRUMENTS                  |  |  |  |
| .MOISTURE METERS                          |  |  |  |
| ..HYGROMETERS                             |  |  |  |
| ..#PSYCHROMETERS                          |  |  |  |
| RT ATMOSPHERIC MOISTURE                   |  |  |  |
| CHEMICAL ANALYSIS                         |  |  |  |
| HUMIDITY                                  |  |  |  |
| HUMIDITY MEASUREMENT                      |  |  |  |
| METEOROLOGICAL INSTRUMENTS                |  |  |  |
| PSYCHROPHILES                             |  |  |  |
| 0404 0407                                 |  |  |  |
| RT MESOPHILES                             |  |  |  |
| MICROORGANISMS                            |  |  |  |
| THERMOPHILES                              |  |  |  |
| PTM (MODULATION)                          |  |  |  |
| USE PULSE TIME MODULATION                 |  |  |  |
| PTOLEMAEUS CRATER                         |  |  |  |
| 3001 3006 3008                            |  |  |  |
| GS CRATERS                                |  |  |  |
| .LUNAR CRATERS                            |  |  |  |
| ..#PTOLEMAEUS CRATER                      |  |  |  |
| RT METEORITE CRATERS                      |  |  |  |
| PUBLIC ADDRESS SYSTEMS                    |  |  |  |
| 0702 3302 3401                            |  |  |  |
| RT % SYSTEMS                              |  |  |  |
| WARNING SYSTEMS                           |  |  |  |
| PUBLIC HEALTH                             |  |  |  |
| 0403 0405                                 |  |  |  |
| GS BIOPHYSICS                             |  |  |  |
| .HEALTH PHYSICS                           |  |  |  |
| ..#PUBLIC HEALTH                          |  |  |  |
| HEALTH                                    |  |  |  |
| .HEALTH PHYSICS                           |  |  |  |
| ..#PUBLIC HEALTH                          |  |  |  |
| RT HAZARDOUS MATERIAL DISPOSAL (IN SPACE) |  |  |  |
| HYGIENE                                   |  |  |  |
| MEDICAL SERVICES                          |  |  |  |
| NONPOINT SOURCES                          |  |  |  |
| OCCUPATIONAL DISEASES                     |  |  |  |
| ORAL HYGIENE                              |  |  |  |
| POLLUTION                                 |  |  |  |
| SANITATION                                |  |  |  |
| URBAN PLANNING                            |  |  |  |
| PUBLIC LAW                                |  |  |  |
| 3403                                      |  |  |  |
| GS LAW (JURISPRUDENCE)                    |  |  |  |
| #PUBLIC LAW                               |  |  |  |
| ..LIABILITIES                             |  |  |  |
| ..LEGAL LIABILITY                         |  |  |  |
| ..PENALTIES                               |  |  |  |
| RT AIR LAW                                |  |  |  |
| INSURANCE (CONTRACTS)                     |  |  |  |
| PUBLIC RELATIONS                          |  |  |  |
| 3402 3404 3406                            |  |  |  |
| RT % COOPERATION                          |  |  |  |
| IMPROVEMENT                               |  |  |  |
| PROMOTION                                 |  |  |  |
| UPGRADING                                 |  |  |  |
| PUBLIC SPEAKING                           |  |  |  |
| 0404                                      |  |  |  |
| UF ORATORY                                |  |  |  |
| RT LECTURES                               |  |  |  |
| SPEECH                                    |  |  |  |
| PUBLICATIONS                              |  |  |  |
| USE DOCUMENTS                             |  |  |  |
| PUERTO RICO                               |  |  |  |
| 1305                                      |  |  |  |
| GS LANDFORMS                              |  |  |  |
| .ISLANDS                                  |  |  |  |
| ..WEST INDIES                             |  |  |  |
| ..#PUERTO RICO                            |  |  |  |
| RT UNITED STATES                          |  |  |  |
| PULLEYS                                   |  |  |  |
| 1504 2308                                 |  |  |  |
| RT % BELTS                                |  |  |  |
| BLOCKS                                    |  |  |  |
| IDLERS                                    |  |  |  |
| ROLLERS                                   |  |  |  |
| WHEELS                                    |  |  |  |
| WINCHES                                   |  |  |  |
| PULLING                                   |  |  |  |
| 3407                                      |  |  |  |
| RT % DRAWING                              |  |  |  |
| % FORCE                                   |  |  |  |
| PROPULSION                                |  |  |  |
| TRACTION                                  |  |  |  |
| PULLING (FREQUENCY STABILITY)             |  |  |  |
| USE FREQUENCY PULLING                     |  |  |  |
| PULMONARY CIRCULATION                     |  |  |  |
| 0405 0408                                 |  |  |  |
| GS CIRCULATION                            |  |  |  |
| .BLOOD CIRCULATION                        |  |  |  |
| ..#PULMONARY CIRCULATION                  |  |  |  |
| RT ALVEOLI                                |  |  |  |
| ARTIFICIAL CARDIAC PACEMAKER              |  |  |  |
| BLOOD PUMPS                               |  |  |  |
| HEART IMPLANTATION                        |  |  |  |
| LUNGS                                     |  |  |  |
| RESPIRATORY SYSTEM                        |  |  |  |
| PULMONARY FUNCTIONS                       |  |  |  |
| 0401 0405 0408                            |  |  |  |
| RT ALVEOLI                                |  |  |  |
| % FUNCTIONS                               |  |  |  |
| LUNGS                                     |  |  |  |
| PULMONARY LESIONS                         |  |  |  |
| 0405                                      |  |  |  |
| GS DISEASES                               |  |  |  |
| #PULMONARY LESIONS                        |  |  |  |
| INJURIES                                  |  |  |  |
| .LESIONS                                  |  |  |  |
| ..#PULMONARY LESIONS                      |  |  |  |
| RT LUNG MORPHOLOGY                        |  |  |  |
| LUNGS                                     |  |  |  |
| OCCUPATIONAL DISEASES                     |  |  |  |
| RESPIRATORY DISEASES                      |  |  |  |
| PULSAR MAGNETOSPHERES                     |  |  |  |
| 2307 3001                                 |  |  |  |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

.SIGNAL ENCODING  
 ..PULSE MODULATION  
 ...PULSE TIME MODULATION  
 ...#PULSE DURATION MODULATION  
 MODULATION  
 .PULSE MODULATION  
 ..PULSE TIME MODULATION  
 ...#PULSE DURATION MODULATION  
 RT MODEMS

PULSE FREQUENCY MODULATION  
 0705 0710 1002 2402  
 UF PFM (MODULATION)  
 GS CODING

.SIGNAL ENCODING  
 ..FREQUENCY MODULATION  
 ...#PULSE FREQUENCY MODULATION  
 ...PULSE MODULATION  
 ...#PULSE FREQUENCY MODULATION  
 MODULATION  
 .FREQUENCY MODULATION  
 .#PULSE FREQUENCY MODULATION  
 .PULSE MODULATION  
 .#PULSE FREQUENCY MODULATION  
 COMMUNICATION EQUIPMENT  
 DIFFERENTIAL PULSE CODE MODULATION  
 MODEMS

RT

PULSE FREQUENCY MODULATION TELEMETRY  
 0501 0702 0705 0708  
 GS TELECOMMUNICATION  
 .RADIO COMMUNICATION  
 ..RADIO TELEMETRY  
 ...#PULSE FREQUENCY MODULATION  
 TELEMETRY  
 .TELEMETRY  
 ..RADIO TELEMETRY  
 ...#PULSE FREQUENCY MODULATION  
 TELEMETRY  
 TRANSMISSION  
 .SIGNAL TRANSMISSION  
 ..TELEMETRY  
 ...#PULSE FREQUENCY MODULATION  
 TELEMETRY

RT COMMUNICATION EQUIPMENT  
 FREQUENCY MODULATION  
 MODULATION  
 PULSE MODULATION  
 RADIO TRANSMISSION  
 SIGNAL ENCODING

PULSE GENERATORS  
 0705 0903 0905 2501  
 RT COMPULSATORS

ELECTRIC PULSES  
 FUNCTION GENERATORS  
 % GENERATORS  
 IMPULSE GENERATORS  
 LASER CAVITIES  
 LASERS  
 PLASMA GENERATORS  
 PULSE REPETITION RATE  
 PULSED RADIATION  
 SHOCK WAVE GENERATORS

PULSE HEATING  
 3303 3501  
 GS HARDENING (MATERIALS)

#PULSE HEATING  
 HEAT TREATMENT  
 .ANNEALING  
 .#PULSE HEATING  
 HEATING  
 .TRANSIENT HEATING  
 .#PULSE HEATING  
 LASER HEATING  
 SIMULATED ANNEALING

RT

PULSE HEIGHT  
 USE PULSE AMPLITUDE

PULSE MODULATION  
 0702 0710 1002 2402  
 GS CODING

.SIGNAL ENCODING  
 .#PULSE MODULATION  
 ...PULSE AMPLITUDE MODULATION  
 ...PULSE CODE MODULATION  
 ...DELTA MODULATION  
 ...DIFFERENTIAL PULSE CODE  
 MODULATION  
 ...PULSE FREQUENCY MODULATION  
 ...PULSE TIME MODULATION  
 ...PULSE DURATION MODULATION  
 ...PULSE POSITION MODULATION  
 MODULATION  
 #PULSE MODULATION  
 ..PULSE AMPLITUDE MODULATION  
 ..PULSE CODE MODULATION  
 ...DELTA MODULATION  
 ...DIFFERENTIAL PULSE CODE  
 MODULATION  
 ..PULSE FREQUENCY MODULATION  
 ..PULSE TIME MODULATION  
 ...PULSE DURATION MODULATION  
 ...PULSE POSITION MODULATION

RT

AMPLITUDE MODULATION  
 DEMODULATORS  
 DEMODULATORS

ELECTRIC PULSES  
 ELECTROMAGNETIC MISSILES  
 ELECTROMAGNETIC PULSES  
 FREQUENCY MODULATION  
 LIGHT MODULATION  
 MODEMS  
 MODULATORS  
 PHASE MODULATION  
 PULSE FREQUENCY MODULATION  
 PULSE FREQUENCY MODULATION  
 TELEMETRY  
 PULSED RADIATION  
 RADIO TELEMETRY  
 TIME DIVISION MULTIPLEXING  
 TRIGATONS

PULSE POSITION MODULATION  
 0710 1002 2402  
 UF PPM (MODULATION)  
 GS CODING  
 .SIGNAL ENCODING  
 ..PULSE MODULATION  
 ...PULSE TIME MODULATION  
 ...#PULSE POSITION MODULATION  
 MODULATION  
 .PULSE MODULATION  
 ..PULSE TIME MODULATION  
 ...#PULSE POSITION MODULATION  
 MODEMS

RT

PULSE RADAR  
 0705 0710  
 GS RADAR  
 #PULSE RADAR  
 ..PULSE DOPPLER RADAR  
 ...EARTH RESOURCES SHUTTLE IMAGING  
 RADAR

RT MONOPULSE RADAR  
 COHERENT RADAR  
 CONTINUOUS WAVE RADAR  
 DOPPLER RADAR  
 ECHO SUPPRESSORS  
 ELECTROMAGNETIC PULSES  
 METEOROLOGICAL RADAR  
 MULTISTATIC RADAR  
 POLYSTATION DOPPLER TRACKING SYSTEM  
 SEARCH RADAR  
 SURVEILLANCE RADAR  
 SYNCHRONIZERS  
 TRACKING RADAR

PULSE RATE  
 0701 0702 0905 1002  
 SN (FOR CARDIOVASCULAR PULSE, USE  
 HEART RATE)  
 UF CHRONOTONS

[illegible]



|                                  |    |                           |    |                          |
|----------------------------------|----|---------------------------|----|--------------------------|
| COMPOSITE STRUCTURES             | RT | COMPOSITE STORAGE DEVICES | RT | COMPUTER STORAGE DEVICES |
| DIES                             | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| EPOXY MATRIX COMPOSITES          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| FIBER COMPOSITES                 | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| GLASS FIBER REINFORCED PLASTICS  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| HOT WORKING                      | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| POLYMER MATRIX COMPOSITES        | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| PREIMPREGNATION                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| PRESSING (FORMING)               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| RESIN MATRIX COMPOSITES          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| PULVERIZING                      | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| USE GRINDING (COMMUNUTION)       | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| PUMICE                           | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| 1805                             | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| GS                               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| ROCKS                            | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .IGNEOUS ROCKS                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .#PUMICE                         | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| ABRASIVES                        | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| OBSIDIAN                         | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| POWDER (PARTICLES)               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| SOILS                            | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| PUMP IMPELLERS                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| 1202 1501                        | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| GS                               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| ROTATING BODIES                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .ROTORS                          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .IMPELLERS                       | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| ..#PUMP IMPELLERS                | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| CENTRIFUGAL COMPRESSORS          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| CENTRIFUGAL PUMPS                | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| PUMP SEALS                       | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| 1501                             | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| GS                               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| SEALS (STOPPERS)                 | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| #PUMP SEALS                      | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| GASKETS                          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| % GLANDS                         | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| GLANDS (SEALS)                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| HERMETIC SEALS                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| LABYRINTH SEALS                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| MOLECULAR PUMPS                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| % PUMPING                        | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| 1501 1504 3407                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| SN                               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| (USE OF A MORE SPECIFIC TERM IS  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| RECOMMENDED--CONSULT THE TERMS   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| LISTED BELOW)                    | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| BLOWING                          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| COMPRESSED AIR                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| COMPRESSING                      | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| CRYOPUMPING                      | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| DRAINAGE                         | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| ELECTRON PUMPING                 | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| JET PUMPS                        | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| LASER PUMPING                    | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| MAGNETIC PUMPING                 | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| MASER PUMPING                    | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| MATERIALS HANDLING               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| NUCLEAR PUMPING                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| OPTICAL PUMPING                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| PLASMA PUMPING                   | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| PUMPS                            | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| PURGING                          | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| WINDMILLS (WINDPOWERED MACHINES) | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| WINDPOWERED PUMPS                | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
|                                  |    |                           |    |                          |
| (LIMITED TO PUMPS FOR            | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| MATERIALS--EXCLUDES HEAT PUMPS)  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| HYDRAULIC PUMPS                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| #PUMPS                           | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .AXIAL FLOW PUMPS                | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| ..TURBINE PUMPS                  | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .BLOOD PUMPS                     | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .CENTRIFUGAL PUMPS               | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .DIFFUSION PUMPS                 | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .ELECTROMAGNETIC PUMPS           | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .FUEL PUMPS                      | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .JET PUMPS                       | RT | COMPUTER STORAGE DEVICES  | RT | COMPUTER STORAGE DEVICES |
| .RAM                             |    |                           |    |                          |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

## PYRAMIDS

1902  
GS GEOMETRY  
.EUCLIDEAN GEOMETRY  
.POLYHEDRONS  
.PYRAMIDS  
RT FRUSTUMS  
PYRAMIDAL BODIES

## PYRANOMETERS

1406 2902 2903 3501  
GS MEASURING INSTRUMENTS  
.RADIATION MEASURING INSTRUMENTS  
.ACTINOMETERS  
.PYRANOMETERS  
RT PHOTOMETERS  
RADIOMETERS  
SKY RADIATION

## PYRAZINES

1808  
GS #PYRAZINES  
.AZINES  
.CYANURATES  
.CYANURIC ACID  
.MECLIZINE  
.METHYLENE BLUE  
.PHENOTHIAZINES

## PYRENEES MOUNTAINS (EUROPE)

1305 1306  
GS LANDFORMS  
.MOUNTAINS  
.PYRENEES MOUNTAINS (EUROPE)  
RT ANDORRA  
FRANCE  
SPAIN

## PYRENES

1808  
GS ORGANIC COMPOUNDS  
.HYDROCARBONS  
.PYRENES

## PYREX (TRADEMARK)

USE BOROSILICATE GLASS

## PYRIDINE NUCLEOTIDES

0403 1808  
GS ORGANIC COMPOUNDS  
.NUCLEOTIDES  
.PYRIDINE NUCLEOTIDES  
PHOSPHORUS COMPOUNDS  
.PHOSPHATES  
.PYRIDINE NUCLEOTIDES

## PYRIDINES

0403 1808  
GS BASES (CHEMICAL)  
.PYRIDINES  
ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
.HETEROCYCLIC COMPOUNDS  
.PYRIDINES  
RT KARL FISCHER REAGENT  
PIPERIDINE  
QUINOLINE

## PYRIDOXINE

0403 0405 1808  
UF VITAMIN B 6  
GS ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
.HETEROCYCLIC COMPOUNDS  
.PYRIDOXINE  
VITAMINS  
.PYRIDOXINE

## PYRIMIDINES

0403 1808  
GS ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
.HETEROCYCLIC COMPOUNDS  
.PYRIMIDINES  
.ALLOXAN  
.THYMIDINE  
.THYMINE  
.URACIL

## PYRITES

1804 1806  
GS CHALCOGENIDES  
.SULFIDES  
.PYRITES  
IRON COMPOUNDS  
.PYRITES  
MINERALS  
.PYRITES  
SULFUR COMPOUNDS  
.SULFIDES  
.PYRITES

## PYRO CERAM (TRADEMARK)

1801 1805 2601  
GS CERAMICS  
PYROCERAM (TRADEMARK)  
GLASS  
PYROCERAM (TRADEMARK)

## PYROELECTRICITY

2304 2601 3303  
GS ELECTRICAL PROPERTIES  
.PYROELECTRICITY  
THERMODYNAMIC PROPERTIES  
.THERMOPHYSICAL PROPERTIES  
.PYROELECTRICITY  
RT PIEZOELECTRICITY  
POLARIZATION (CHARGE SEPARATION)

## PYROGEN

0603 1507 1805  
GS GASES  
.FLAMMABLE GASES  
.PYROGEN  
RT TORCHES

## PYROGRAPHALLOY

USE COMPOSITE MATERIALS  
PYROLYTIC GRAPHITE  
REFRACTORY MATERIALS

## PYROHELIOMETERS

1301 1406 3009  
UF HELIOMETRY  
GS MEASURING INSTRUMENTS  
.HELIOMETERS  
.PYROHELIOMETERS  
OPTICAL EQUIPMENT  
.HELIOMETERS  
.PYROHELIOMETERS  
TELESCOPES  
.HELIOMETERS  
.PYROHELIOMETERS

## PYROHYDROLYSIS

0601 3303  
GS CHEMICAL REACTIONS  
PYROHYDROLYSIS  
RT PYROLYSIS

## PYRDLYSIS

0602 3303  
GS CHEMICAL REACTIONS  
.CRACKING (CHEMICAL ENGINEERING)  
.PYROLYSIS  
.THERMAL DECOMPOSITION  
.PYROLYSIS  
DECOMPOSITION  
.CRACKING (CHEMICAL ENGINEERING)  
.PYROLYSIS  
.THERMAL DECOMPOSITION  
.PYROLYSIS  
RT ABLATION  
ENDOTHERMIC REACTIONS  
EXOTHERMIC REACTIONS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>           PYROHYDROLYSIS<br/>           THERMAL ABSORPTION<br/>           THERMAL DEGRADATION<br/>           THERMAL INSTABILITY<br/>           THERMOGRAVIMETRY<br/> <br/>           PYROLYTIC GRAPHITE<br/>           1808 3303 3501<br/>           UF PYROGRAPHALLOY<br/>           GS CARBONACEOUS MATERIALS<br/>           .GRAPHITE<br/>           .#PYROLYTIC GRAPHITE<br/>           MINERALS<br/>           .GRAPHITE<br/>           .#PYROLYTIC GRAPHITE<br/>           PYROLYTIC MATERIALS<br/>           #PYROLYTIC GRAPHITE<br/>           RT HEAT SHIELDING<br/> <br/>           PYROLYTIC MATERIALS<br/>           1804 1808 3303 3501<br/>           GS #PYROLYTIC MATERIALS<br/>           .PYROLYTIC GRAPHITE<br/>           RT ABLATIVE MATERIALS<br/>           CERAMICS<br/>           % MATERIALS<br/>           REFRACTORY COATINGS<br/>           REFRACTORY MATERIALS<br/> <br/>           PYROMETALLURGY<br/>           1701 1704 3303 3501<br/>           RT AEROTHERMOCHEMISTRY<br/>           ALLOYING<br/>           CHLORINATION<br/>           % CONVERTERS<br/>           HEAT BALANCE<br/>           METAL WORKING<br/>           % METALLURGY<br/>           REFINING<br/>           SINTERING<br/>           SUBLIMATION<br/>           THERMOCHEMISTRY<br/> <br/>           PYROMETERS<br/>           1406 1408 3501<br/>           GS MEASURING INSTRUMENTS<br/>           .TEMPERATURE MEASURING INSTRUMENTS<br/>           .#PYROMETERS<br/>           ...RADIATION PYROMETERS<br/>           ...THERMOCOUPLE PYROMETERS<br/>           RT TEMPERATURE MEASUREMENT         </p> | <p>           PYROPHORIC MATERIALS<br/>           1805 2701 2702<br/>           RT EXPLOSIVES<br/>           FLAMMABILITY<br/>           HYPERGOLIC ROCKET PROPELLANTS<br/>           IGNITERS<br/>           IGNITION TEMPERATURE<br/>           % MATERIALS<br/>           METAL COMBUSTION<br/>           SOLID PROPELLANT IGNITION<br/>           SPONTANEOUS COMBUSTION<br/> <br/>           PYROPHYLITE<br/>           1806<br/>           GS ALUMINUM COMPOUNDS<br/>           .ALUMINUM SILICATES<br/>           .#PYROPHYLITE<br/>           MINERALS<br/>           #PYROPHYLITE<br/>           SILICON COMPOUNDS<br/>           .SILICATES<br/>           ..ALUMINUM SILICATES<br/>           ..#PYROPHYLITE<br/>           RT ALUMINUM OXIDES<br/> <br/>           PYROTECHNICS<br/>           3302<br/>           UF FIREWORKS<br/>           GS #PYROTECHNICS<br/>           .HMX<br/>           RT AMMUNITION<br/>           BOMBS (ORDNANCE)<br/>           CHEMICAL FUELS<br/>           DOUBLE BASE PROPELLANTS<br/>           EXPLOSIVES<br/>           % FLARES<br/>           GRENADES<br/>           ILLUMINATING<br/>           INCENDIARY AMMUNITION<br/>           INITIATORS (EXPLOSIVES)<br/>           ORDNANCE<br/>           PLASTIC PROPELLANTS<br/>           PROJECTILES<br/>           RDX<br/>           % ROCKETS<br/>           % SIGNALS<br/>           THERMITES<br/> <br/>           PYROXENES<br/>           1804 1806<br/>           GS CHALCOGENIDES<br/>           .OXIDES<br/>           .#PYROXENES<br/>           ...ENSTATITE<br/>           MINERALS         </p> | <p>           #PYROXENES<br/>           .ENSTATITE<br/>           SILICON COMPOUNDS<br/>           .SILICATES<br/>           .#PYROXENES<br/>           ...ENSTATITE<br/>           ECLOGITE<br/>           IGNEOUS ROCKS<br/>           REGOLITH<br/>           ROCKS<br/>           SOILS<br/> <br/>           PYROXYLIN<br/>           USE CELLULOSE NITRATE<br/> <br/>           PYRRHOTITE<br/>           1806 2305 2307<br/>           GS CHALCOGENIDES<br/>           .SULFIDES<br/>           .#PYRRHOTITE<br/>           ...TROILITE<br/>           IRON COMPOUNDS<br/>           #PYRRHOTITE<br/>           ..TROILITE<br/>           MINERALS<br/>           #PYRRHOTITE<br/>           ...TROILITE<br/>           SULFUR COMPOUNDS<br/>           .SULFIDES<br/>           .#PYRRHOTITE<br/>           ...TROILITE<br/> <br/>           PYRROLES<br/>           0409 1808<br/>           GS ORGANIC COMPOUNDS<br/>           .CYCLIC COMPOUNDS<br/>           ..HETEROCYCLIC COMPOUNDS<br/>           ...AZOLES<br/>           ...#PYRROLES<br/>           .....CARBAZOLES<br/>           .....INDOLES<br/>           .....TRYPTOPHAN<br/>           RT METHOXY SYSTEMS<br/> <br/>           PYRRONES (TRADEMARK)<br/>           0603 1808<br/>           RT % POLYMERS<br/> <br/>           PYRUVATES<br/>           0603 1808<br/>           RT ORGANIC LIQUIDS<br/> <br/>           P3V AIRCRAFT<br/>           USE P-3 AIRCRAFT         </p> |
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# NASA THESAURUS HIERARCHICAL UPDATE

P78-2 SATELLITE  
USE SCATHA SATELLITE

Q DEVICES  
2307 2502  
RT MAGNETIC MIRRORS  
PLASMA PINCH  
ZETA PINCH

Q FACTORS  
0902 1001 2402  
UF HIGH Q  
QUALITY FACTORS  
RT FIGURE OF MERIT  
RESONANT VIBRATION  
SPECTRAL RESOLUTION  
TUNING

Q SWITCHED LASERS  
1703  
GS STIMULATED EMISSION DEVICES  
.LASERS

..PULSED LASERS  
..#Q SWITCHED LASERS  
RT ARGON LASERS  
CARBON DIOXIDE LASERS  
CHEMICAL LASERS  
GAS LASERS  
RUBY LASERS  
SEMICONDUCTOR LASERS  
SOLID STATE LASERS

Q VALUES  
2405  
GS VALUE  
#Q VALUES

QAM (MODULATION)  
USE QUADRATURE AMPLITUDE MODULATION

QATAR  
1305  
GS NATIONS  
#QATAR  
RT ASIA

QCD  
USE QUANTUM CHROMODYNAMICS

QH-50 HELICOPTER  
0206  
UF DASH HELICOPTER  
DSN HELICOPTER  
GYRODYNE DSN-3 HELICOPTER  
GYRODYNE MILITARY AIRCRAFT

GS GYRODYNE AIRCRAFT  
#QH-50 HELICOPTER  
V/STOL AIRCRAFT  
.ROTARY WING AIRCRAFT  
..HELICOPTERS  
...MILITARY HELICOPTERS  
...#QH-50 HELICOPTER

QPSK  
USE QUADRATURE PHASE SHIFT KEYING

QSO (RADIO SOURCES)  
USE QUASARS

QUADRANTID METEORIDS  
3005  
GS CELESTIAL BODIES  
.METEOROID SHOWERS  
.#QUADRANTID METEORIDS  
.METEORIDS  
.#QUADRANTID METEORIDS

QUADRANTS  
1902 3001  
GS GEOMETRY  
.EUCLIDEAN GEOMETRY  
..ANALYTIC GEOMETRY  
...#QUADRANTS

QUADRATIC EQUATIONS  
1902 1903 3501  
GS ALGEBRA  
.NONLINEAR EQUATIONS  
.#QUADRATIC EQUATIONS  
ANALYSIS (MATHEMATICS)  
.REAL VARIABLES  
..NONLINEAR EQUATIONS  
...#QUADRATIC EQUATIONS  
FIELD THEORY (ALGEBRA)  
#QUADRATIC EQUATIONS  
RT % EQUATIONS  
POLYNOMIALS

QUADRATIC PROGRAMMING  
1902 1903  
GS OPTIMIZATION  
..MATHEMATICAL PROGRAMMING  
.#QUADRATIC PROGRAMMING  
RESEARCH  
#QUADRATIC PROGRAMMING  
RT % PROGRAMMING

QUADRATURE AMPLITUDE MODULATION  
0702 0707  
UF QAM (MODULATION)

GS CODING  
..SIGNAL ENCODING  
..AMPLITUDE MODULATION  
..#QUADRATURE AMPLITUDE MODULATION  
..AMPLITUDE MODULATION  
.#QUADRATURE AMPLITUDE MODULATION  
RT PHASE SHIFT KEYING  
QUADRATURE PHASE SHIFT KEYING

QUADRATURE APPROXIMATION  
USE QUADRATURES

QUADRATURE PHASE SHIFT KEYING  
0702 1001 2402  
UF QPSK

GS CODING  
..SIGNAL ENCODING  
..PHASE MODULATION  
...PHASE SHIFT KEYING  
...#QUADRATURE PHASE SHIFT KEYING  
KEYING  
.PHASE SHIFT KEYING  
.#QUADRATURE PHASE SHIFT KEYING  
MODULATION  
.PHASE MODULATION  
..PHASE SHIFT KEYING

RT BINARY PHASE SHIFT KEYING  
QUADRATURE AMPLITUDE MODULATION  
SATELLITE TRANSMISSION

QUADRATURES  
1904 3006 3009  
UF QUADRATURE APPROXIMATION  
RT CIRCULAR ORBITS  
ORBIT CALCULATION  
ORBITAL MECHANICS  
ORBITS  
SPACE MECHANICS

QUADRIPHASE SHIFT KEYING  
USE QUADRATURE PHASE SHIFT KEYING

QUADRUPOLE LENSES  
USE MAGNETIC LENSES

QUADRUPOLE NETWORKS  
2304 2405  
RT % NETWORKS

QUADRUPOLES  
2304 2401 2405  
RT % DIPOLES

|                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NUCLEAR QUADRUPOLE RESONANCE<br>POLARITY                                                                                                                                                                                                                                                                           | EVALUATION<br>FIGURE OF MERIT<br>FINENESS<br>FLIGHT CHARACTERISTICS<br>% GRADE<br>IMPURITIES<br>% MATERIALS TESTS<br>% PERFORMANCE<br>POLLUTION<br>PRECISION<br>PRODUCT DEVELOPMENT<br>PURITY<br>RELIABILITY<br>% RESISTANCE<br>SPECIFICATIONS<br>STABILITY<br>% TESTS<br>TOTAL QUALITY MANAGEMENT<br>UPGRADING<br>VALIDITY<br>VARIABILITY                                                                                                                                                                                                                                                                                                              | HYPOTHESES<br>INFRARED INSPECTION<br>INSPECTION<br>LEAST SQUARES METHOD<br>LINEAR PREDICTION<br>LOW TEMPERATURE TESTS<br>MANN-WHITNEY-WILCOXON U TEST<br>% MATERIALS TESTS<br>MEAN<br>MEDIAN (STATISTICS)<br>MODE (STATISTICS)<br>NONDESTRUCTIVE TESTS<br>NORMALIZING (STATISTICS)<br>OPERATIONS RESEARCH<br>OPTIMIZATION<br>ORTHOGONAL FUNCTIONS<br>ORTHOGONALITY<br>PRECISION<br>PROBABILITY THEORY<br>PROCESS CONTROL (INDUSTRY)<br>% PROCESSES<br>PRODUCT DEVELOPMENT<br>PRODUCTION MANAGEMENT<br>PRODUCTS<br>RANDOM ERRORS<br>RANDOM SAMPLING<br>RANGE (EXTREMES)<br>REGRESSION ANALYSIS<br>REGRESSION COEFFICIENTS<br>RELIABILITY<br>RELIABILITY ENGINEERING<br>SAMPLING<br>SCHEDULING<br>SEQUENTIAL ANALYSIS<br>SPACECRAFT RELIABILITY<br>SPECIFICATIONS<br>STANDARD DEVIATION<br>STANDARDIZATION<br>STANDARDS<br>STATIC TESTS<br>STATISTICAL ANALYSIS<br>STATISTICAL CORRELATION<br>STATISTICAL DISTRIBUTIONS<br>STATISTICAL TESTS<br>STRUCTURAL RELIABILITY<br>% SYSTEMS<br>TASK COMPLEXITY<br>TASKS<br>% TESTS<br>TOLERANCES (MECHANICS)<br>ULTRASONIC FLAW DETECTION<br>VALUE ENGINEERING<br>VARIABILITY<br>VARIANCE (STATISTICS)<br>WEAR TESTS |
| QUAIL MISSILE<br>3101 3401<br>GS DECOYS<br>#QUAIL MISSILE<br>MISSILES<br>.AIR TO SURFACE MISSILES<br>.#QUAIL MISSILE<br>COUNTERMEASURES<br>TURBOJET ENGINES                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| RT                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QUALIFICATIONS<br>3402 3404 3406<br>RT CERTIFICATION<br>CONTRACTORS<br>EDUCATION<br>EXPERIENCE<br>FITNESS<br>PERSONALITY TESTS<br>PERSONNEL<br>% TESTS                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QUALITATIVE ANALYSIS<br>0601 0602<br>GS CHEMICAL TESTS<br>.CHEMICAL ANALYSIS<br>.#QUALITATIVE ANALYSIS<br>ANALYTICAL CHEMISTRY<br>ELECTROPHOTOMETRY<br>FLAME SPECTROSCOPY<br>GAS ANALYSIS<br>MASS SPECTROMETERS<br>MICROANALYSIS<br>NEUTRON ACTIVATION ANALYSIS<br>QUANTITATIVE ANALYSIS<br>SPECTROSCOPIC ANALYSIS | QUALITY CONTROL<br>1505 3404 4001<br>UF RELIABILITY CONTROL<br>GS #QUALITY CONTROL<br>RT .TOTAL QUALITY MANAGEMENT<br>ACCELERATED LIFE TESTS<br>ACCEPTABILITY<br>AIRCRAFT RELIABILITY<br>ASSURANCE<br>AVERAGE<br>BAYES THEOREM<br>BURN-IN<br>CERTIFICATION<br>CHEMICAL TESTS<br>CIRCUIT RELIABILITY<br>COMPONENT RELIABILITY<br>CONFIDENCE<br>CONFIDENCE LIMITS<br>CONSTRUCTION<br>% CONTROL<br>CORRELATION<br>CORRELATION COEFFICIENTS<br>COVARIANCE<br>DATA SAMPLING<br>DEGREES OF FREEDOM<br>ELECTRICAL PROPERTIES<br>ELECTRONIC EQUIPMENT TESTS<br>ERROR DETECTION CODES<br>ERRORS<br>ESTIMATES<br>ESTIMATING<br>EXPERIMENT DESIGN<br>EXTRAPOLATION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QUALITY<br>1505 3408 4001<br>GS #QUALITY<br>.ENVIRONMENTAL QUALITY<br>.AIR QUALITY<br>.WATER QUALITY<br>.RIDING QUALITY<br>ACCURACY<br>ADEQUACY<br>APPEARANCE<br>COMPUTER SYSTEMS PERFORMANCE<br>CONCENTRATION (COMPOSITION)<br>CONSISTENCY<br>CONTAMINANTS<br>CONTROLLABILITY<br>DURABILITY                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

# NASA THESAURUS HIERARCHICAL UPDATE

QUALITY FACTORS  
USE Q FACTORS

QUANTILES

1902  
GS STATISTICAL ANALYSIS  
#QUANTILES  
RT MATHEMATICAL MODELS  
STATISTICAL DISTRIBUTIONS  
% STATISTICS  
SYMMETRY

QUANTITATIVE ANALYSIS

0601  
GS CHEMICAL TESTS  
.CHEMICAL ANALYSIS  
.QUANTITATIVE ANALYSIS  
...KJELDAHL METHOD  
...VAN SLYKE METHOD  
ANALYTICAL CHEMISTRY  
CHROMATOGRAPHY  
ELECTROPHOTOMETRY  
GAS ANALYSIS  
GRAVIMETRY  
IODIMETRY  
KARL FISCHER REAGENT  
MICROANALYSIS  
NEUTRON ACTIVATION ANALYSIS  
POLAROGRAPHY  
QUALITATIVE ANALYSIS  
RADIOCHEMICAL SEPARATION  
SPECTROSCOPIC ANALYSIS  
VOLUMETRIC ANALYSIS

QUANTITY

USE AMOUNT

QUANTIZATION  
USE MEASUREMENT

QUANTIZER

USE COUNTERS

QUANTUM AMPLIFIERS

0705 0905 2402  
GS AMPLIFIERS  
#QUANTUM AMPLIFIERS  
RT LASERS  
LIGHT AMPLIFIERS  
TWO-WAVELENGTH LASERS  
ULTRASHORT PULSED LASERS  
ULTRAVIOLET LASERS

QUANTUM CHEMISTRY

0602

GS PHYSICAL CHEMISTRY  
#QUANTUM CHEMISTRY  
RT % CHEMISTRY  
MOLECULAR ORBITALS  
NUCLEAR CHEMISTRY  
QUANTUM MECHANICS

QUANTUM CHROMODYNAMICS

2403

UF COLOR (PARTICLE PHYSICS)

QCD

GS FIELD THEORY (PHYSICS)

#QUANTUM CHROMODYNAMICS

..INSTANTONS

RT % DYNAMICS

GLUONS

LEPTONS

PARTICLE INTERACTIONS

QUANTUM MECHANICS

QUARK MODELS

QUARKS

STRING THEORY

% THEORIES

QUANTUM COUNTERS

1406

GS MEASURING INSTRUMENTS

.COUNTERS

..RADIATION COUNTERS

..#QUANTUM COUNTERS

.RADIATION MEASURING INSTRUMENTS

..RADIATION COUNTERS

..#QUANTUM COUNTERS

RT SQUID (DETECTORS)

QUANTUM EFFICIENCY

2308

RT ENERGY CONVERSION EFFICIENCY

ENERGY TECHNOLOGY

HETEROJUNCTION DEVICES

LASER OUTPUTS

SOLAR CELLS

VOLT-AMPERE CHARACTERISTICS

QUANTUM ELECTRODYNAMICS

1002 2311 2402

GS ELECTRODYNAMICS

#QUANTUM ELECTRODYNAMICS

QUANTUM MECHANICS

#QUANTUM ELECTRODYNAMICS

ELECTROMAGNETIC FIELDS

FEYNMAN DIAGRAMS

FIELD THEORY (PHYSICS)

LANDAU-GINZBURG EQUATIONS

RESONANCE FLUORESCENCE  
SELF CONSISTENT FIELDS

QUANTUM ELECTRONICS

1001

RT % ELECTRONICS

LASERS

QUANTUM MECHANICS

QUANTUM THEORY

RESONANT TUNNELING

TUNNEL JUNCTIONS

QUANTUM GENERATORS

USE STIMULATED EMISSION DEVICES

QUANTUM MECHANICS

2308 2311 2402

GS #QUANTUM MECHANICS

.PAULI EXCLUSION PRINCIPLE

.QUANTUM ELECTRODYNAMICS

ATOMIC INTERACTIONS

BETHE-SALPETER EQUATION

BORN APPROXIMATION

DYSON THEORY

ELECTROMAGNETIC INTERACTIONS

ENERGY DISTRIBUTION

FERMI-DIRAC STATISTICS

FUNCTION SPACE

GROUP VELOCITY

HYLLERAAS COORDINATES

LIGHT-CONE EXPANSION

% MECHANICS (PHYSICS)

ORR-SOMMERFELD EQUATIONS

PHASE VELOCITY

QUANTUM CHEMISTRY

QUANTUM CHROMODYNAMICS

QUANTUM ELECTRONICS

QUANTUM OPTICS

RACAH COEFFICIENT

RELATIVITY

SQUEEZED STATES (QUANTUM THEORY)

STATISTICAL MECHANICS

STRANGENESS

U SPIN SPACE

WAVE PACKETS

QUANTUM NUMBERS

0905 2401 2403

RT ANGULAR MOMENTUM

ELECTRONS

ENERGY LEVELS

NUCLEAR SPIN

% NUMBERS

PARITY

SELECTION RULES (NUCLEAR PHYSICS)

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

.....STISHOVITE

MINERALS

#QUARTZ

...COESITE

..STISHOVITE

SILICON COMPOUNDS

.SILICON OXIDES

..SILICON DIOXIDE

...#QUARTZ

....COESITE

.....STISHOVITE

RT ABRASIVES

FELSITE

FLINT

IGNEOUS ROCKS

ROCKS

SANDS

SOILS

QUARTZ CRYSTALS

1804

GS CRYSTALS

RT #QUARTZ CRYSTALS

FREQUENCY CONTROL

FREQUENCY STABILITY

RADIO TRANSMITTERS

SILICON DIOXIDE

QUARTZ LAMPS

1411 2310 2601

GS LIGHTING EQUIPMENT

.LUMINAIRES

..#QUARTZ LAMPS

QUARTZ TRANSDUCERS

1413 2601 3501

GS TRANSDUCERS

RT #QUARTZ TRANSDUCERS

PIEZOELECTRIC CRYSTALS

PRESSURE SENSORS

QUARTZITE

1306

GS ROCKS

.METAMORPHIC ROCKS

..#QUARTZITE

QUASARS

0702 0705 2402 2901 2902 2903 3001

UF QSO (RADIO SOURCES)

QUASI-STELLAR RADIO SOURCES

GS CELESTIAL BODIES

.RADIO SOURCES (ASTRONOMY)

..#QUASARS

RT ACTIVE GALACTIC NUCLEI

ACTIVE GALAXIES

BLAZARS

EXTRAGALACTIC RADIO SOURCES

GALAXIES

GRAVITATIONAL COLLAPSE

IRREGULAR GALAXIES

PULSARS

RADIO ASTRONOMY

RADIO BURSTS

RADIO EMISSION

RADIO GALAXIES

RADIO JETS (ASTRONOMY)

RADIO STARS

STARS

X RAY SPECTRA

QUASAT

1901

SN (QUASAR SATELLITE)

GS OBSERVATORIES

.ASTRONOMICAL OBSERVATORIES

..ASTRONOMICAL SATELLITES

...#QUASAT

RT EUROPEAN SPACE PROGRAMS

NASA PROGRAMS

RADIO ASTRONOMY

RADIO TELESCOPES

SPACEBORNE ASTRONOMY

VERY LONG BASE INTERFEROMETRY

QUASI-PARTICLES

USE ELEMENTARY EXCITATIONS

QUASI-STEADY STATES

2311

RT

EQUILIBRIUM FLOW

FLUID DYNAMICS

NONEQUILIBRIUM FLOW

STEADY FLOW

STEADY STATE CREEP

UNIFORM FLOW

QUASI-STELLAR RADIO SOURCES

USE QUASARS

QUASILINEARITY

USE NONLINEARITY

QUATERNARY ALLOYS

1701 1704

GS ALLOYS

#QUATERNARY ALLOYS

RT ALLOYING

QUATERNIONS

1902

RT CLASSICAL MECHANICS

NUMBER THEORY

QUEBEC

1307

GS

NATIONS

.CANADA

..#QUEBEC

QUEFRENCIES

0601

GS

FREQUENCIES

.ACOUSTIC FREQUENCIES

..AUDIO FREQUENCIES

...#QUEFRENCIES

RT CEPSTRA

% QUENCHING

1502 1701 2305 3303 3501

SN (USE OF A MORE SPECIFIC TERM IS

RECOMMENDED--CONSULT THE TERMS

LISTED BELOW)

RT EXTINGUISHING

QUENCHING (ATOMIC PHYSICS)

QUENCHING (COOLING)

RAPID QUENCHING (METALLURGY)

QUENCHING (ATOMIC PHYSICS)

2311

GS

GYRATION

.PRECENSION

..#QUENCHING (ATOMIC PHYSICS)

RT ANGULAR MOMENTUM

MAGNETIC MOMENTS

PARTICLE SPIN

% PHYSICS

% QUENCHING

QUENCHING (COOLING)

3303 3501

UF FLAME QUENCHING

GS COOLING

#QUENCHING (COOLING)

RT BATHS

COMBUSTION

DIPPING

EXTINGUISHING

HARDENING (MATERIALS)

HEAT TREATMENT

MICROSTRUCTURE

% QUENCHING

SUBMERGING

SUPERCoolING

SUPERSATURATION

```

THERMOMECHANICAL TREATMENT
WATER IMMERSION

QUERY LANGUAGES
O802
GS
  LANGUAGES
  .COMMAND LANGUAGES
  .#QUERY LANGUAGES
RT HUMAN-COMPUTER INTERFACE
INFORMATION RETRIEVAL

QUESTOL AIRCRAFT
O201 O204 O207
SN (EXPERIMENTAL STOL TRANSPORT
RESEARCH AIRPLANE)
UF EXPERIMENTAL STOL TRANSPORT RSCH
AIRPLANE
GS RESEARCH AIRCRAFT
#QUESTOL AIRCRAFT
V/STOL AIRCRAFT
.SHORT TAKEOFF AIRCRAFT
.#QUESTOL AIRCRAFT
RT % AIRCRAFT
NASA PROGRAMS

QUEUEING THEORY
O802 1902 1905 3404
RT ARPA COMPUTER NETWORK
BUNCHING
MATHEMATICAL MODELS
OPERATIONS RESEARCH
STATISTICAL ANALYSIS
STOCHASTIC PROCESSES
% THEORIES

QUIET ENGINE PROGRAM
O202 O204 O209 2801 2805 3409
GS PROGRAMS
.NASA PROGRAMS
.#QUIET ENGINE PROGRAM
RT AIRCRAFT ENGINES
ENGINE NOISE
JET AIRCRAFT NOISE
JET ENGINES
NOISE REDUCTION

QUINOLINE
O408 O409 1808
GS BASES (CHEMICAL)
#QUINOLINE
NITROGEN COMPOUNDS
#QUINOLINE
ORGANIC COMPOUNDS
#QUINOLINE
RT ALKALOIDS

QUINONES
O603 1808
UF BENZOQUINONE
CHINONE
GS ORGANIC COMPOUNDS
#QUINONES
RT KETONES

QUINOXALINES
1809
GS ORGANIC COMPOUNDS
.HYDROCARBONS
.#QUINOXALINES
PLASTICS
.SYNTHETIC RESINS
..THERMOPLASTIC RESINS
..#QUINOXALINES
RESINS
.SYNTHETIC RESINS
..THERMOPLASTIC RESINS
.#QUINOXALINES
RT POLYMERIZATION

QUOTIENTS
1902
RT DIVIDING (MATHEMATICS)

R CORONAE BOREALIS STARS
2306 3001 3006
UF RCB STARS
GS CELESTIAL BODIES
.STARS
..SUPERGIANT STARS
..#R CORONAE BOREALIS STARS
..VARIABLE STARS
...IRREGULAR VARIABLE STARS
...#R CORONAE BOREALIS STARS
RT CARBON STARS
COOL STARS
DUST
STELLAR ENVELOPES
STELLAR MASS EJECTION

RA-28 ENGINE
2801 2805
GS ENGINES
.AIR BREATHING ENGINES
..GAS TURBINE ENGINES
...JET ENGINES
...TURBOJET ENGINES
....#RA-28 ENGINE
.INTERNAL COMBUSTION ENGINES

DRUGS
PYRIDINES

QUITONES
O603 1808
UF BENZOQUINONE
CHINONE
GS ORGANIC COMPOUNDS
#QUINONES
RT KETONES

RABBITS
O409 O402
GS ANIMALS
.VERTEBRATES
..MAMMALS
...RODENTS
...#RABBITS

RACAH COEFFICIENT
1902 2308
RT ANGULAR MOMENTUM
COEFFICIENTS
COUPLING
QUANTUM MECHANICS
TRANSFORMATIONS (MATHEMATICS)

RACE FACTORS
3402 3403
RT ANTHROPOLOGY
CULTURE (SOCIAL SCIENCES)
ETHNIC FACTORS
HUMAN BEINGS
HUMAN PERFORMANCE
RACES (ANTHROPOLOGY)
SOCIAL FACTORS
SOCIOLOGY
% VARIABLE

RACES (ANTHROPOLOGY)
3402 3403
RT AMERICAN INDIANS
ANTHROPOLOGY
CULTURE (SOCIAL SCIENCES)
HUMAN BEINGS
MINORITIES
RACE FACTORS

RACETRACKS (PARTICLE ACCELERATORS)
2202 2405
RT % ACCELERATORS
ELECTROMAGNETS
MAGNETIC FIELDS
PARTICLE ACCELERATION
PARTICLE ACCELERATORS
PARTICLE TRAJECTORIES

RACETRACKS (PARTICLE ACCELERATORS)
2202 2405
RT % ACCELERATORS
ELECTROMAGNETS
MAGNETIC FIELDS
PARTICLE ACCELERATION
PARTICLE ACCELERATORS
PARTICLE TRAJECTORIES

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# NASA THESAURUS HIERARCHICAL UPDATE

% RACKS  
 0801 0904 0905 1103 1504  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT RACKS (FRAMES)  
 RACKS (GEARS)  
 RACKS (FRAMES)  
 1103  
 RT % RACKS  
 % SHELVES  
 % STORAGE  
 SUPPORTS  
 RACKS (GEARS)  
 1501  
 GS GEARS  
 #RACKS (GEARS)  
 RT % RACKS  
 TRANSLATIONAL MOTION  
 RACON BEACONS  
 USE RADAR BEACONS  
 RADANT  
 0705 0901  
 GS ANTENNAS  
 .DIRECTIONAL ANTENNAS  
 .RADAR ANTENNAS  
 .RADANT  
 RADAR EQUIPMENT  
 .RADAR ANTENNAS  
 .RADANT  
 RADAR FILTERS  
 RADOMES  
 SLOT ANTENNAS  
 WAVEGUIDE ANTENNAS  
 RADAR  
 0705  
 UF RADIO DETECTION AND RANGING  
 GS #RADAR  
 .AIRBORNE RADAR  
 .AIRBORNE SURVEILLANCE RADAR  
 .COHERENT RADAR  
 .CONTINUOUS WAVE RADAR  
 .DOPPLER RADAR  
 .MULTISTATIC RADAR  
 .IMAGING RADAR  
 .INCOHERENT SCATTER RADAR  
 .EISCAT RADAR SYSTEM (EUROPE)  
 .INFRARED RADAR  
 .LANDING RADAR

.METEOROLOGICAL RADAR  
 .MOVING TARGET INDICATORS  
 .MULTISPECTRAL RADAR  
 .OPTICAL RADAR  
 .DIFFERENTIAL ABSORPTION LIDAR  
 .PULSE RADAR  
 .PULSE DOPPLER RADAR  
 .EARTH RESOURCES SHUTTLE IMAGING  
 RADAR  
 .MONOPULSE RADAR  
 .RADAR MEASUREMENT  
 .RANGE AND RANGE RATE TRACKING  
 .SATELLITE-BORNE RADAR  
 .SEARCH RADAR  
 .NORTH AMERICAN SEARCH AND  
 RANGING RADAR  
 .OVER-THE-HORIZON RADAR  
 .SECONDARY RADAR  
 .SPACE BASED RADAR  
 .SURVEILLANCE RADAR  
 .AIRBORNE SURVEILLANCE RADAR  
 .COBRA DANE (RADAR)  
 .MULTISTATIC RADAR  
 .SYNTHETIC APERTURE RADAR  
 .SIDE-LOOKING RADAR  
 .TRACKING RADAR  
 .COBRA DANE (RADAR)  
 .TRADEX RADAR SYSTEM  
 .VENUS ORBITING IMAGING RADAR  
 (SPACECRAFT)  
 AIRCRAFT INSTRUMENTS  
 CANCELLATION CIRCUITS  
 CIRCUMLUNAR COMMUNICATION  
 COLLISION AVOIDANCE  
 DISPLAY DEVICES  
 DISTANCE MEASURING EQUIPMENT  
 ELECTROMAGNETIC RADIATION  
 FLIGHT INSTRUMENTS  
 INSTRUMENT LANDING SYSTEMS  
 LUNAR COMMUNICATION  
 MICROWAVE ABSORPTION  
 NAVIGATION INSTRUMENTS  
 NIGHT FLIGHTS (AIRCRAFT)  
 PULSE COMPRESSION  
 RADAR DETECTION  
 SCATTEROMETERS  
 RADAR ABSORBERS  
 0705 1409 2402  
 GS ABSORBERS (MATERIALS)  
 #RADAR ABSORBERS  
 .ANTIRADAR COATINGS  
 .COUNTERMEASURES  
 .ELECTROMAGNETIC ABSORPTION  
 .MICROWAVE ABSORPTION  
 RT  
 COUNTERMEASURES  
 ELECTROMAGNETIC ABSORPTION  
 MICROWAVE ABSORPTION

RADAR ALTIMETERS  
 USE RADIO ALTIMETERS  
 RADAR ANTENNAS  
 0705 0901 1402  
 GS ANTENNAS  
 .DIRECTIONAL ANTENNAS  
 .RADAR ANTENNAS  
 .RADANT  
 RADAR EQUIPMENT  
 #RADAR ANTENNAS  
 .RADANT  
 AIRCRAFT ANTENNAS  
 DIPOLEXERS  
 DIPOLE ANTENNAS  
 DOGHOUSES (ELECTRONICS)  
 HIGH RESOLUTION COVERAGE ANTENNAS  
 HORN ANTENNAS  
 LENS ANTENNAS  
 MICROWAVE ANTENNAS  
 PARABOLIC ANTENNAS  
 RADOMES  
 REFLECTOR ANTENNAS  
 SCHWARZSCHILD ANTENNAS  
 SIDELOBE REDUCTION  
 SLOT ANTENNAS  
 STEERABLE ANTENNAS  
 RADAR APPROACH CONTROL  
 0705 1402 3110  
 UF RAPCON (CONTROL)  
 GS APPROACH CONTROL  
 #RADAR APPROACH CONTROL  
 GROUND BASED CONTROL  
 .AIR TRAFFIC CONTROL  
 .RADAR APPROACH CONTROL  
 TRAFFIC CONTROL  
 .AIR TRAFFIC CONTROL  
 .RADAR APPROACH CONTROL  
 AIRBORNE RADAR APPROACH  
 AIRCRAFT GUIDANCE  
 APPROACH INDICATORS  
 % CONTROL  
 INSTRUMENT LANDING SYSTEMS  
 LANDING AIDS  
 LANDING INSTRUMENTS  
 LANDING RADAR  
 RADARSOPES  
 SURVEILLANCE RADAR  
 RADAR ASTRONOMY  
 0705 0710 1412 3001  
 GS ASTRONOMY  
 #RADAR ASTRONOMY

| RT        | RADIO ASTRONOMY                    | RT        | RADIO ASTRONOMY                    |
|-----------|------------------------------------|-----------|------------------------------------|
| RT        | RADAR CROSS SECTIONS               | RT        | RADAR CROSS SECTIONS               |
| 0705 2402 | RT ANGELS (RADAR)                  | 0705 2402 | RT ANGELS (RADAR)                  |
| GS        | % CROSS SECTIONS                   | GS        | % CROSS SECTIONS                   |
|           | LOW OBSERVABLE REENTRY VEHICLES    |           | LOW OBSERVABLE REENTRY VEHICLES    |
|           | MOVING TARGET INDICATORS           |           | MOVING TARGET INDICATORS           |
| RT        | RADAR DATA                         | RT        | RADAR DATA                         |
|           | 0703 0705 1409                     |           | 0703 0705 1409                     |
|           | RT % DATA                          |           | RT % DATA                          |
|           | MICROWAVE PHOTOGRAPHY              |           | MICROWAVE PHOTOGRAPHY              |
|           | VIDEO DATA                         |           | VIDEO DATA                         |
| RT        | RADAR DETECTION                    | RT        | RADAR DETECTION                    |
|           | 0705 0709 1409                     |           | 0705 0709 1409                     |
|           | GS DETECTION                       |           | GS DETECTION                       |
|           | . MISSILE DETECTION                |           | . MISSILE DETECTION                |
|           | . #RADAR DETECTION                 |           | . #RADAR DETECTION                 |
|           | COHERENT RADAR                     |           | COHERENT RADAR                     |
|           | CONTINUOUS WAVE RADAR              |           | CONTINUOUS WAVE RADAR              |
|           | DIGITAL RADAR SYSTEMS              |           | DIGITAL RADAR SYSTEMS              |
|           | DOPPLER RADAR                      |           | DOPPLER RADAR                      |
|           | ELECTRONIC COUNTERMEASURES         |           | ELECTRONIC COUNTERMEASURES         |
|           | ELECTRONIC WARFARE                 |           | ELECTRONIC WARFARE                 |
|           | MULTISTATIC RADAR                  |           | MULTISTATIC RADAR                  |
|           | OPTICAL RADAR                      |           | OPTICAL RADAR                      |
|           | OVER-THE-HORIZON RADAR             |           | OVER-THE-HORIZON RADAR             |
|           | RADAR TARGET SCATTER SITE PROGRAM  |           | RADAR TARGET SCATTER SITE PROGRAM  |
|           | RADARSOPES                         |           | RADARSOPES                         |
|           | RESOLUTION CELL                    |           | RESOLUTION CELL                    |
|           | SATELLITE-BORNE RADAR              |           | SATELLITE-BORNE RADAR              |
|           | SEARCH RADAR                       |           | SEARCH RADAR                       |
|           | SIGNAL DETECTION                   |           | SIGNAL DETECTION                   |
| RT        | RADAR DIRECTION FINDERS            | RT        | RADAR DIRECTION FINDERS            |
|           | USE RADIO DIRECTION FINDERS        |           | USE RADIO DIRECTION FINDERS        |
| RT        | RADAR DISPLAYS                     | RT        | RADAR DISPLAYS                     |
|           | USE RADARSOPES                     |           | USE RADARSOPES                     |
| RT        | RADAR ECHOES                       | RT        | RADAR ECHOES                       |
|           | 0705 0709 2402                     |           | 0705 0709 2402                     |
|           | UF RADAR REFLECTIONS               |           | UF RADAR REFLECTIONS               |
|           | GS ECHOES                          |           | GS ECHOES                          |
|           | #RADAR ECHOES                      |           | #RADAR ECHOES                      |
|           | .. ANGELS (RADAR)                  |           | .. ANGELS (RADAR)                  |
|           | .. CLUTTER                         |           | .. CLUTTER                         |
|           | .. LUNAR RADAR ECHOES              |           | .. LUNAR RADAR ECHOES              |
|           | .. SOLAR RADAR ECHOES              |           | .. SOLAR RADAR ECHOES              |
|           | .. VENUS RADAR ECHOES              |           | .. VENUS RADAR ECHOES              |
| RT        | AIRBORNE RADAR                     | RT        | AIRBORNE RADAR                     |
|           | AURORAL ECHOES                     |           | AURORAL ECHOES                     |
|           | CHAFF                              |           | CHAFF                              |
| RT        | RADAR BEAMS                        | RT        | RADAR BEAMS                        |
|           | 0705 0710 2402                     |           | 0705 0710 2402                     |
|           | GS BEAMS (RADIATION)               |           | GS BEAMS (RADIATION)               |
|           | #RADAR BEAMS                       |           | #RADAR BEAMS                       |
|           | RT BEAMFORMING                     |           | RT BEAMFORMING                     |
|           | PENCIL BEAMS                       |           | PENCIL BEAMS                       |
| RT        | RADAR CLUTTER MAPS                 | RT        | RADAR CLUTTER MAPS                 |
|           | 0704 0705                          |           | 0704 0705                          |
|           | GS MAPS                            |           | GS MAPS                            |
|           | #RADAR CLUTTER MAPS                |           | #RADAR CLUTTER MAPS                |
| RT        | RADAR CORNER REFLECTORS            | RT        | RADAR CORNER REFLECTORS            |
|           | 0705                               |           | 0705                               |
|           | UF LUNEBERG LENSES                 |           | UF LUNEBERG LENSES                 |
|           | GS RADAR EQUIPMENT                 |           | GS RADAR EQUIPMENT                 |
|           | . RADAR REFLECTORS                 |           | . RADAR REFLECTORS                 |
|           | . #RADAR CORNER REFLECTORS         |           | . #RADAR CORNER REFLECTORS         |
|           | REFLECTORS                         |           | REFLECTORS                         |
|           | . RADAR REFLECTORS                 |           | . RADAR REFLECTORS                 |
|           | . #RADAR CORNER REFLECTORS         |           | . #RADAR CORNER REFLECTORS         |
|           | REFLECTOR ANTENNAS                 |           | REFLECTOR ANTENNAS                 |
|           | RETROREFLECTORS                    |           | RETROREFLECTORS                    |
| RT        | RADAR CROSS SECTIONS               | RT        | RADAR CROSS SECTIONS               |
|           | 0705 2402                          |           | 0705 2402                          |
|           | GS ATTENUATION                     |           | GS ATTENUATION                     |
|           | . WAVE ATTENUATION                 |           | . WAVE ATTENUATION                 |
|           | . #RADAR ATTENUATION               |           | . #RADAR ATTENUATION               |
|           | ATMOSPHERIC ATTENUATION            |           | ATMOSPHERIC ATTENUATION            |
|           | ELECTROMAGNETIC WAVE TRANSMISSION  |           | ELECTROMAGNETIC WAVE TRANSMISSION  |
|           | RADIO ATTENUATION                  |           | RADIO ATTENUATION                  |
|           | SIDELobe REDUCTION                 |           | SIDELobe REDUCTION                 |
|           | SIGNAL TRANSMISSION                |           | SIGNAL TRANSMISSION                |
|           | WAVE PROPAGATION                   |           | WAVE PROPAGATION                   |
| RT        | RADAR BEACONS                      | RT        | RADAR BEACONS                      |
|           | 0705 0710 2402                     |           | 0705 0710 2402                     |
|           | UF RACON BEACONS                   |           | UF RACON BEACONS                   |
|           | GS NAVIGATION AIDS                 |           | GS NAVIGATION AIDS                 |
|           | . BEACONS                          |           | . BEACONS                          |
|           | . #RADAR BEACONS                   |           | . #RADAR BEACONS                   |
|           | ... DISCRETE ADDRESS BEACON SYSTEM |           | ... DISCRETE ADDRESS BEACON SYSTEM |
|           | RADAR EQUIPMENT                    |           | RADAR EQUIPMENT                    |
|           | #RADAR BEACONS                     |           | #RADAR BEACONS                     |
|           | . . DISCRETE ADDRESS BEACON SYSTEM |           | . . DISCRETE ADDRESS BEACON SYSTEM |
|           | AIRCRAFT COMMUNICATION             |           | AIRCRAFT COMMUNICATION             |
|           | COMPASSES                          |           | COMPASSES                          |
|           | POSITION (LOCATION)                |           | POSITION (LOCATION)                |
|           | SOLAR COMPASSES                    |           | SOLAR COMPASSES                    |
|           | TRANSPONDERS                       |           | TRANSPONDERS                       |
| RT        | RADAR CROSS SECTIONS               | RT        | RADAR CROSS SECTIONS               |
|           | 0705 2402                          |           | 0705 2402                          |
|           | GS ATTENUATION                     |           | GS ATTENUATION                     |
|           | . WAVE                             |           |                                    |

# NASA THESAURUS HIERARCHICAL UPDATE

0702 1306  
 GS GEOLOGY  
 #RADAR GEOLOGY  
 RT GEOLOGICAL SURVEYS  
 SHUTTLE IMAGING RADAR

RADAR HOMING MISSILES  
 2102  
 GS MISSILES  
 #RADAR HOMING MISSILES  
 RT MILITARY TECHNOLOGY  
 MISSILE CONTROL  
 MISSILE SYSTEMS  
 TARGET RECOGNITION

RADAR IMAGERY  
 0702 0705 0903  
 GS IMAGERY  
 #RADAR IMAGERY  
 RT AIRBORNE RADAR  
 CHANGE DETECTION  
 EARTH RESOURCES SHUTTLE IMAGING  
 RADAR  
 IMAGE ANALYSIS  
 IMAGING RADAR  
 IMAGING TECHNIQUES  
 INFRARED RADAR  
 LUNAR EQUATOR  
 MAGELLAN SPACECRAFT (NASA)  
 RADAR MAPS  
 RESOLUTION CELL  
 SHUTTLE IMAGING RADAR  
 SIDE-LOOKING RADAR  
 X RAY IMAGERY

RADAR MAPS  
 0705 0708 1409 2003 3009  
 GS MAPS  
 #RADAR MAPS  
 RT AIRBORNE RADAR  
 MAP MATCHING GUIDANCE  
 METEOROLOGICAL CHARTS  
 RADAR IMAGERY

RADAR MEASUREMENT  
 0705 1406 3501  
 GS RADAR  
 #RADAR MEASUREMENT  
 RT ALTIMETRY  
 DIFFERENTIAL ABSORPTION LIDAR  
 DISTANCE MEASURING EQUIPMENT  
 % MEASUREMENT  
 RADIO ALTIMETERS  
 RANGEFINDING  
 SATELLITE ALTIMETRY

RADAR NAVIGATION  
 0705 1402 2104  
 GS NAVIGATION  
 #RADAR NAVIGATION  
 RT AIR NAVIGATION  
 AIR TRAFFIC CONTROL  
 AIRCRAFT GUIDANCE  
 ALL-WEATHER AIR NAVIGATION  
 AUTOMATIC FLIGHT CONTROL  
 CELESTIAL NAVIGATION  
 COLLISION AVOIDANCE  
 DEAD RECKONING  
 DISTANCE  
 DISTANCE MEASURING EQUIPMENT  
 DOPPLER NAVIGATION  
 DOPPLER RADAR  
 DOPPLER-FIZEAU EFFECT  
 GROUND BASED CONTROL  
 INERTIAL NAVIGATION  
 INTERPLANETARY NAVIGATION  
 MAP MATCHING GUIDANCE  
 RADARSCOPES  
 RADIO NAVIGATION  
 SATELLITE NAVIGATION SYSTEMS  
 SPACE NAVIGATION  
 SURFACE NAVIGATION  
 TACAN

RADAR NETWORKS  
 0701  
 UF MULTIRADAR TRACKING  
 GS TRACKING NETWORKS  
 #RADAR NETWORKS  
 RT DOPPLER RADAR  
 % NETWORKS  
 POLYSTATION DOPPLER TRACKING SYSTEM  
 TRACKING STATIONS

RADAR OBSERVATION  
 USE RADAR TRACKING

RADAR PHOTOGRAPHY  
 0705 0708 1407 1409 2003  
 GS IMAGERY  
 #RADAR PHOTOGRAPHY  
 PHOTOGRAPHY  
 .MULTISPECTRAL PHOTOGRAPHY  
 .#RADAR PHOTOGRAPHY  
 BLACK AND WHITE PHOTOGRAPHY  
 MICROWAVE PHOTOGRAPHY  
 RADARSCOPES  
 SPECTRAL RECONNAISSANCE  
 ULTRAVIOLET PHOTOGRAPHY

RADAR RANGE  
 0705 0709  
 GS DISTANCE  
 #RADAR RANGE  
 RT CONTINUOUS WAVE RADAR  
 OPTICAL SLANT RANGE  
 OVER-THE-HORIZON RADAR  
 RADIO RANGE

RADAR RECEIVERS  
 0701 0705 1409  
 GS RADAR EQUIPMENT  
 #RADAR RECEIVERS  
 RECEIVERS

RT RADAR RECEIVERS  
 AIRBORNE RADAR  
 DIGITAL RADAR SYSTEMS  
 ELECTROMAGNETIC NOISE  
 MICROWAVE SENSORS  
 RADIO RECEIVERS  
 REPEATERS

RADAR RECEPTION  
 0705 1409  
 RT RADIO RECEPTION  
 % RECEIVING  
 SIDELOBE REDUCTION

RADAR REFLECTIONS  
 USE RADAR ECHOES

RADAR REFLECTORS  
 0701 0705 0710  
 GS RADAR EQUIPMENT  
 #RADAR REFLECTORS  
 .-RADAR CORNER REFLECTORS  
 REFLECTORS  
 #RADAR REFLECTORS  
 .-RADAR CORNER REFLECTORS

RT PARABOLIC ANTENNAS  
 PARABOLIC REFLECTORS  
 RADIO ECHOES  
 REFLECTOR ANTENNAS  
 SIDELOBE REDUCTION

RADAR RESOLUTION  
 0705 0710  
 GS RESOLUTION  
 #RADAR RESOLUTION  
 ANGULAR RESOLUTION  
 DISPLAY DEVICES  
 HIGH RESOLUTION COVERAGE ANTENNAS  
 SIDELOBE REDUCTION  
 SPECTRAL RESOLUTION

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                              |                                                                                                                |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| RADAR SCANNING<br>0702 0705 0710<br>GS<br>SCANNING                                              | RADAR TRACKING<br>0705 0709 1109<br>UF<br>RADAR OBSERVATION                                                                                                                                                                                                                                                                                                            | RADIAL VELOCITY<br>1901<br>GS                                                                                                                                                                                                                                                                                                | CANADIAN SPACECRAFT<br>#RADARSAT                                                                               |
| RT<br>CONICAL SCANNING<br>DIGITAL RADAR SYSTEMS<br>FREQUENCY SCANNING                           | GS<br>TRACKING (POSITION)<br>#RADAR TRACKING                                                                                                                                                                                                                                                                                                                           | RT                                                                                                                                                                                                                                                                                                                           | CANADIAN SPACE PROGRAM<br>SYNTHETIC APERTURE RADAR                                                             |
| METEOROLOGICAL RADAR<br>MULTIPLE BEAM INTERVAL SCANNERS<br>PANORAMIC SCANNING<br>RADIO TRACKING | RT<br>AUTOMATED RADAR TERMINAL SYSTEM<br>BALLISTIC MISSILE EARLY WARNING<br>SYSTEM                                                                                                                                                                                                                                                                                     | RADARSCOPIES<br>0705<br>UF                                                                                                                                                                                                                                                                                                   |                                                                                                                |
| SIDE-LOOKING RADAR<br>SURVEILLANCE                                                              | GS<br>COMPENSATORY TRACKING<br>DIGITAL RADAR SYSTEMS<br>DOPPLER RADAR<br>EARLY WARNING SYSTEMS<br>METEOROLOGICAL RADAR<br>MONOPULSE RADAR<br>MOVING TARGET INDICATORS<br>MULTIPLE TARGET TRACKING<br>PURSUIT TRACKING<br>RADIO TRACKING<br>RANGE AND RANGE RATE TRACKING<br>RANGEFINDING<br>RAWINSONDES<br>SEARCH RADAR<br>SLEWING                                     | GS<br>#RADARSCOPIES<br>..PLAN POSITION INDICATORS<br>RADAR EQUIPMENT<br>#RADARSCOPIES<br>..PLAN POSITION INDICATORS<br>AIRCRAFT GUIDANCE<br>INDICATING INSTRUMENTS<br>MICROWAVE IMAGERY<br>MICROWAVE PHOTOGRAPHY<br>RADAR APPROACH CONTROL<br>RADAR DETECTION<br>RADAR NAVIGATION<br>RADAR PHOTOGRAPHY<br>SURVEILLANCE RADAR |                                                                                                                |
| RADAR SCATTERING<br>0705 0710 3407<br>GS<br>SCATTERING                                          | RT<br>EISCAT RADAR SYSTEM (EUROPE)<br>INCOHERENT SCATTER RADAR<br>INCOHERENT SCATTERING<br>RADAR TARGET SCATTER SITE PROGRAM<br>SCATTEROMETERS                                                                                                                                                                                                                         | RT                                                                                                                                                                                                                                                                                                                           |                                                                                                                |
| RT<br>#RADAR SCATTERING                                                                         | GS<br>EISCAT RADAR SYSTEM (EUROPE)<br>INCOHERENT SCATTER RADAR<br>INCOHERENT SCATTERING<br>RADAR TARGET SCATTER SITE PROGRAM<br>SCATTEROMETERS                                                                                                                                                                                                                         | RT                                                                                                                                                                                                                                                                                                                           |                                                                                                                |
| RADAR SIGNATURES<br>0705 0710<br>GS<br>SIGNATURES                                               | RT<br>COBRA DANE (RADAR)<br>DETECTION<br>IMAGERY<br>MICROWAVE SIGNATURES<br>SIGNATURE ANALYSIS<br>TARGET RECOGNITION                                                                                                                                                                                                                                                   | RADIAL DISTRIBUTION<br>3408<br>GS                                                                                                                                                                                                                                                                                            |                                                                                                                |
| RT<br>DETECTION                                                                                 | RT<br>TRANSponder CONTROL GROUP                                                                                                                                                                                                                                                                                                                                        | RT                                                                                                                                                                                                                                                                                                                           | DISTRIBUTION (PROPERTY)<br>#RADIAL DISTRIBUTION<br>RAYLEIGH DISTRIBUTION<br>STAR DISTRIBUTION<br>WIND PROFILES |
| RADAR TARGET SCATTER SITE PROGRAM<br>0705 3401<br>UF<br>RATSCAT PROGRAM                         | RADAR TRANSMISSION<br>0705 0710 0901<br>GS<br>TRANSMISSION<br>.ELECTROMAGNETIC WAVE TRANSMISSION<br>.RADAR TRANSMISSION<br>.SIGNAL TRANSMISSION<br>.RADAR TRANSMISSION<br>ATMOSPHERIC ATTENUATION<br>DIGITAL RADAR SYSTEMS<br>EISCAT RADAR SYSTEM (EUROPE)<br>ELECTROMAGNETIC PULSES<br>RADIO TRANSMISSION<br>RADOME MATERIALS<br>WAVE ATTENUATION<br>WAVE PROPAGATION | RADIAL DRAINAGE PATTERNS<br>USE<br>DRAINAGE PATTERNS                                                                                                                                                                                                                                                                         |                                                                                                                |
| GS<br>PROGRAMS                                                                                  | RT<br>#RADAR TARGET SCATTER SITE PROGRAM<br>TARGETS<br>.RADAR TARGETS<br>.RADAR TARGET SCATTER SITE PROGRAM<br>RADAR DETECTION<br>RADAR SCATTERING                                                                                                                                                                                                                     | RADIAL FLOW<br>1202 1203 2502 3304<br>GS<br>FLUID FLOW<br>#RADIAL FLOW<br>AXIAL FLOW<br>CENTRIFUGAL COMPRESSORS<br>DIFFUSION<br>FLOW GEOMETRY<br>GAS FLOW<br>HEAT TRANSMISSION<br>TWO DIMENSIONAL FLOW                                                                                                                       |                                                                                                                |
| RT<br>RADAR TARGETS                                                                             | RT<br>RADAR TARGETS<br>#RADAR TARGET SCATTER SITE PROGRAM<br>AIRBORNE RADAR<br>DIGITAL RADAR SYSTEMS<br>EARLY WARNING SYSTEMS<br>MULTIPLE TARGET TRACKING                                                                                                                                                                                                              | RT                                                                                                                                                                                                                                                                                                                           |                                                                                                                |
| RADAR TARGETS<br>0705 0709<br>GS<br>TARGETS                                                     | RADAR TRANSMITTERS<br>0705 0701 0705 0905<br>GS<br>RADAR EQUIPMENT<br>#RADAR TRANSMITTERS<br>TRANSMITTERS<br>#RADAR TRANSMITTERS                                                                                                                                                                                                                                       | RADIAL VELOCITY<br>0710 2311 3001 3009<br>GS<br>RATES (PER TIME)<br>#RADIAL VELOCITY<br>VELOCITY<br>#RADIAL VELOCITY<br>ASTRONOMICAL SPECTROSCOPY                                                                                                                                                                            |                                                                                                                |



|                                     |                             |                                   |  |
|-------------------------------------|-----------------------------|-----------------------------------|--|
| HARMONIC RADIATION                  | RADIATION PYROMETERS        | ...X RAY ABSORPTION               |  |
| HEATING                             | RADIATION SHIELDING         | ..MOLECULAR ABSORPTION            |  |
| INCIDENT RADIATION                  | RADIATION SICKNESS          | ..SELF ABSORPTION                 |  |
| INFRARED RADIATION                  | RADIATION SOURCES           | RT % ABSORPTION                   |  |
| INNER RADIATION BELT                | RADIATION SPECTRA           | ABSORPTION CROSS SECTIONS         |  |
| INTERSTELLAR RADIATION              | RADIATION THERAPY           | ATMOSPHERIC ATTENUATION           |  |
| ION CYCLOTRON RADIATION             | RADIATION TOLERANCE         | GAMMA RAY ABSORPTIOMETRY          |  |
| IONIZING RADIATION                  | RADIATION TRANSPORT         | GOLAY DETECTOR CELLS              |  |
| IRRADIATION                         | RADIATION TRAPPING          | GRAY GAS                          |  |
| KIRCHHOFF LAW OF RADIATION          | RADIATIVE TRANSFER          | INTERSTELLAR EXTINCTION           |  |
| LIGHT (VISIBLE RADIATION)           | RADIOACTIVITY               | MATERIAL ABSORPTION               |  |
| LONG WAVE RADIATION                 | RADIOLOGY                   | NEUTRON ABSORBERS                 |  |
| LONGITUDINAL WAVES                  | REFLECTED WAVES             | NUCLEAR REACTIONS                 |  |
| LUNAR RADIATION                     | RELIC RADIATION             | PHOTON ABSORPTIOMETRY             |  |
| LYMAN ALPHA RADIATION               | RESONANCE FLUORESCENCE      | % RADIATION                       |  |
| LYMAN BETA RADIATION                | SELF ABSORPTION             | RADIATION CHEMISTRY               |  |
| MICROWAVES                          | SHORT WAVE RADIATION        | STOPPING POWER                    |  |
| MODULATED CONTINUOUS RADIATION      | SILICON RADIATION DETECTORS |                                   |  |
| MONOCHROMATIC RADIATION             | SKY RADIATION               | RADIATION AND METEOROID SATELLITE |  |
| NEAR INFRARED RADIATION             | SOLAR CORPUSCULAR RADIATION | 1308 3107                         |  |
| NEAR ULTRAVIOLET RADIATION          | SOLAR RADIATION             | GS                                |  |
| NONTHERMAL RADIATION                | SOLAR RADIATION SHIELDING   | GS                                |  |
| NUCLEAR MEDICINE                    | SOLAR RADIATION 1 SATELLITE |                                   |  |
| NUCLEAR RADIATION                   | SOLAR RADIATION 3 SATELLITE |                                   |  |
| NUCLEON POTENTIAL                   | SOLAR WIND                  |                                   |  |
| OUTER RADIATION BELT                | SOUND WAVES                 | RADIATION BELTS                   |  |
| PHOTONS                             | SPECTRAL EMISSION           | 1302 2402 2903                    |  |
| PLANE WAVES                         | STANDING WAVES              | UF                                |  |
| PLANETARY RADIATION                 | STELLAR RADIATION           | GS                                |  |
| PLASMA RADIATION                    | STOKES LAW OF RADIATION     |                                   |  |
| POLARIZED ELECTROMAGNETIC RADIATION | STRATOSPHERE RADIATION      |                                   |  |
| POLARIZED RADIATION                 | SYNCHROTRON RADIATION       |                                   |  |
| POST-BLAST NUCLEAR RADIATION        | TEMPERATURE EFFECTS         |                                   |  |
| PULSED RADIATION                    | TERRESTRIAL RADIATION       |                                   |  |
| QUANTUM THEORY                      | THERMAL RADIATION           |                                   |  |
| RADIANT FLUX DENSITY                | TRAP PROGRAM                |                                   |  |
| RADIANT HEATING                     | TROPOSPHERIC RADIATION      |                                   |  |
| RADIATION ABSORPTION                | ULTRASONIC RADIATION        |                                   |  |
| RADIATION BELTS                     | ULTRAVIOLET RADIATION       |                                   |  |
| RADIATION CHEMISTRY                 | VOLTERRA EQUATIONS          |                                   |  |
| RADIATION COUNTERS                  | X RAY SOURCES               |                                   |  |
| RADIATION DAMAGE                    |                             |                                   |  |
| RADIATION DETECTORS                 |                             |                                   |  |
| RADIATION DISTRIBUTION              |                             |                                   |  |
| RADIATION DOSAGE                    |                             |                                   |  |
| RADIATION EFFECTS                   |                             |                                   |  |
| RADIATION HARDENING                 |                             |                                   |  |
| RADIATION HAZARDS                   |                             |                                   |  |
| RADIATION INJURIES                  |                             |                                   |  |
| RADIATION LAWS                      |                             |                                   |  |
| RADIATION MEASUREMENT               |                             |                                   |  |
| RADIATION MEASURING INSTRUMENTS     |                             |                                   |  |
| RADIATION METEOROID SPACECRAFT      |                             |                                   |  |
| RADIATION PRESSURE                  |                             |                                   |  |
| RADIATION PROTECTION                |                             |                                   |  |

|                               |  |
|-------------------------------|--|
| RADIATION ABSORPTION          |  |
| 0401 1301 2402                |  |
| GS                            |  |
| ENERGY ABSORPTION             |  |
| #RADIATION ABSORPTION         |  |
| ...ELECTROMAGNETIC ABSORPTION |  |
| ...AURORAL ABSORPTION         |  |
| ...GAMMA RAY ABSORPTION       |  |
| ...INFRARED ABSORPTION        |  |
| ...MICROWAVE ABSORPTION       |  |
| ...MULTIPHOTON ABSORPTION     |  |
| ...PHOTOABSORPTION            |  |
| ...POLAR CAP ABSORPTION       |  |
| ...ULTRAVIOLET ABSORPTION     |  |

|                                  |         |
|----------------------------------|---------|
| RT                               | % BELTS |
| AEROSPACE ENVIRONMENTS           |         |
| COSMIC RAYS                      |         |
| EARTH ATMOSPHERE                 |         |
| EARTH MAGNETOSPHERE              |         |
| ELECTRON DENSITY (CONCENTRATION) |         |
| ELECTRON PRECIPITATION           |         |
| ELECTRON TRAJECTORIES            |         |
| ELECTRONS                        |         |
| ELEMENTARY PARTICLES             |         |



# NASA THESAURUS HIERARCHICAL UPDATE

|                                  |  |  |  |
|----------------------------------|--|--|--|
| ENTRAPMENT                       |  |  |  |
| EXOSPHERE                        |  |  |  |
| EXTRATERRESTRIAL RADIATION       |  |  |  |
| IONIZING RADIATION               |  |  |  |
| IONOSPHERIC DRIFT                |  |  |  |
| MAGNETIC FIELDS                  |  |  |  |
| MIRROR POINT                     |  |  |  |
| PLASMAS (PHYSICS)                |  |  |  |
| PROTON PRECIPITATION             |  |  |  |
| PROTONS                          |  |  |  |
| % RADIATION                      |  |  |  |
| SOLAR RADIATION                  |  |  |  |
| TRAPPING                         |  |  |  |
| UPPER ATMOSPHERE                 |  |  |  |
|                                  |  |  |  |
| RADIATION CHEMISTRY              |  |  |  |
| O710                             |  |  |  |
| GS #RADIATION CHEMISTRY          |  |  |  |
| .PHOTODECOMPOSITION              |  |  |  |
| .PHOTODISSOCIATION               |  |  |  |
| .PHOTOLYSIS                      |  |  |  |
| .RADIOLYSIS                      |  |  |  |
| RT % CHEMISTRY                   |  |  |  |
| ELECTROMAGNETIC RADIATION        |  |  |  |
| % RADIATION                      |  |  |  |
| RADIATION ABSORPTION             |  |  |  |
|                                  |  |  |  |
| RADIATION COUNTERS               |  |  |  |
| 2402 2902 2903                   |  |  |  |
| UF IONIZATION COUNTERS           |  |  |  |
| PARTICLE COUNTERS                |  |  |  |
| PARTICLE DETECTORS               |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .COUNTERS                        |  |  |  |
| .#RADIATION COUNTERS             |  |  |  |
| ...CERENKOV COUNTERS             |  |  |  |
| ...ELECTRON COUNTERS             |  |  |  |
| ...GEIGER COUNTERS               |  |  |  |
| ...NEUTRON COUNTERS              |  |  |  |
| ...NEUTRON SPECTROMETERS         |  |  |  |
| ...PARTICLE TELESCOPES           |  |  |  |
| ...PROPORTIONAL COUNTERS         |  |  |  |
| ...QUANTUM COUNTERS              |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION COUNTERS             |  |  |  |
| ...CERENKOV COUNTERS             |  |  |  |
| ...ELECTRON COUNTERS             |  |  |  |
| ...GEIGER COUNTERS               |  |  |  |
| ...NEUTRON COUNTERS              |  |  |  |
| ...NEUTRON SPECTROMETERS         |  |  |  |
| ...PARTICLE TELESCOPES           |  |  |  |
| ...PROPORTIONAL COUNTERS         |  |  |  |
| ...QUANTUM COUNTERS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION DETECTORS            |  |  |  |
| ...DOSIMETERS                    |  |  |  |
| ...THRESHOLD DETECTORS           |  |  |  |
| (DOSIMETERS)                     |  |  |  |
| ...GOLAY DETECTOR CELLS          |  |  |  |
| ...SILICON RADIATION DETECTORS   |  |  |  |
| RT % DETECTORS                   |  |  |  |
| GEIGER COUNTERS                  |  |  |  |
| HEALTH PHYSICS                   |  |  |  |
| MULTI-ANODE MICROCHANNEL ARRAYS  |  |  |  |
| % RADIATION                      |  |  |  |
| SATELLITE-BORNE INSTRUMENTS      |  |  |  |
| VELA SATELLITES                  |  |  |  |
|                                  |  |  |  |
| RADIATION DISTRIBUTION           |  |  |  |
| 1301 2402 2903 3304              |  |  |  |
| UF RADIATION FIELDS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION DETECTORS            |  |  |  |
| ...DOSIMETERS                    |  |  |  |
| ...THRESHOLD DETECTORS           |  |  |  |
| (DOSIMETERS)                     |  |  |  |
| ...GOLAY DETECTOR CELLS          |  |  |  |
| ...SILICON RADIATION DETECTORS   |  |  |  |
| RT % DETECTORS                   |  |  |  |
| GEIGER COUNTERS                  |  |  |  |
| HEALTH PHYSICS                   |  |  |  |
| MULTI-ANODE MICROCHANNEL ARRAYS  |  |  |  |
| % RADIATION                      |  |  |  |
| SATELLITE-BORNE INSTRUMENTS      |  |  |  |
| VELA SATELLITES                  |  |  |  |
|                                  |  |  |  |
| RADIATION DISTRIBUTION           |  |  |  |
| 1301 2402 2903 3304              |  |  |  |
| UF RADIATION FIELDS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION DETECTORS            |  |  |  |
| ...DOSIMETERS                    |  |  |  |
| ...THRESHOLD DETECTORS           |  |  |  |
| (DOSIMETERS)                     |  |  |  |
| ...GOLAY DETECTOR CELLS          |  |  |  |
| ...SILICON RADIATION DETECTORS   |  |  |  |
| RT % DETECTORS                   |  |  |  |
| GEIGER COUNTERS                  |  |  |  |
| HEALTH PHYSICS                   |  |  |  |
| MULTI-ANODE MICROCHANNEL ARRAYS  |  |  |  |
| % RADIATION                      |  |  |  |
| SATELLITE-BORNE INSTRUMENTS      |  |  |  |
| VELA SATELLITES                  |  |  |  |
|                                  |  |  |  |
| RADIATION DISTRIBUTION           |  |  |  |
| 1301 2402 2903 3304              |  |  |  |
| UF RADIATION FIELDS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION DETECTORS            |  |  |  |
| ...DOSIMETERS                    |  |  |  |
| ...THRESHOLD DETECTORS           |  |  |  |
| (DOSIMETERS)                     |  |  |  |
| ...GOLAY DETECTOR CELLS          |  |  |  |
| ...SILICON RADIATION DETECTORS   |  |  |  |
| RT % DETECTORS                   |  |  |  |
| GEIGER COUNTERS                  |  |  |  |
| HEALTH PHYSICS                   |  |  |  |
| MULTI-ANODE MICROCHANNEL ARRAYS  |  |  |  |
| % RADIATION                      |  |  |  |
| SATELLITE-BORNE INSTRUMENTS      |  |  |  |
| VELA SATELLITES                  |  |  |  |
|                                  |  |  |  |
| RADIATION DISTRIBUTION           |  |  |  |
| 1301 2402 2903 3304              |  |  |  |
| UF RADIATION FIELDS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION DETECTORS            |  |  |  |
| ...DOSIMETERS                    |  |  |  |
| ...THRESHOLD DETECTORS           |  |  |  |
| (DOSIMETERS)                     |  |  |  |
| ...GOLAY DETECTOR CELLS          |  |  |  |
| ...SILICON RADIATION DETECTORS   |  |  |  |
| RT % DETECTORS                   |  |  |  |
| GEIGER COUNTERS                  |  |  |  |
| HEALTH PHYSICS                   |  |  |  |
| MULTI-ANODE MICROCHANNEL ARRAYS  |  |  |  |
| % RADIATION                      |  |  |  |
| SATELLITE-BORNE INSTRUMENTS      |  |  |  |
| VELA SATELLITES                  |  |  |  |
|                                  |  |  |  |
| RADIATION DISTRIBUTION           |  |  |  |
| 1301 2402 2903 3304              |  |  |  |
| UF RADIATION FIELDS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |
| .RADIATION MEASURING INSTRUMENTS |  |  |  |
| .#RADIATION DETECTORS            |  |  |  |
| ...DOSIMETERS                    |  |  |  |
| ...THRESHOLD DETECTORS           |  |  |  |
| (DOSIMETERS)                     |  |  |  |
| ...GOLAY DETECTOR CELLS          |  |  |  |
| ...SILICON RADIATION DETECTORS   |  |  |  |
| RT % DETECTORS                   |  |  |  |
| GEIGER COUNTERS                  |  |  |  |
| HEALTH PHYSICS                   |  |  |  |
| MULTI-ANODE MICROCHANNEL ARRAYS  |  |  |  |
| % RADIATION                      |  |  |  |
| SATELLITE-BORNE INSTRUMENTS      |  |  |  |
| VELA SATELLITES                  |  |  |  |
|                                  |  |  |  |
| RADIATION DISTRIBUTION           |  |  |  |
| 1301 2402 2903 3304              |  |  |  |
| UF RADIATION FIELDS              |  |  |  |
|                                  |  |  |  |
| ...SCINTILLATION COUNTERS        |  |  |  |
| ...SPARK CHAMBERS                |  |  |  |
| BUBBLE CHAMBERS                  |  |  |  |
| CHANNEL MULTIPLIERS              |  |  |  |
| CLOUD CHAMBERS                   |  |  |  |
| COINCIDENCE CIRCUITS             |  |  |  |
| DOSIMETERS                       |  |  |  |
| ELECTROSTATIC PROBES             |  |  |  |
| FLUENCE                          |  |  |  |
| GAS DISCHARGE TUBES              |  |  |  |
| HODOSCOPES                       |  |  |  |
| ION TRAPS (INSTRUMENTATION)      |  |  |  |
| IONIZATION CHAMBERS              |  |  |  |
| IONIZING RADIATION               |  |  |  |
| NUCLEAR EMULSIONS                |  |  |  |
| PARTICLE FLUX DENSITY            |  |  |  |
| PROTON FLUX DENSITY              |  |  |  |
| RADIANT FLUX DENSITY             |  |  |  |
| % RADIATION                      |  |  |  |
| SCINTILLATING FIBERS             |  |  |  |
| SPECTROMETERS                    |  |  |  |
|                                  |  |  |  |
| RADIATION DAMAGE                 |  |  |  |
| O408 O411 O504 2402              |  |  |  |
| GS DAMAGE                        |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RADIATION EFFECTS                |  |  |  |
| #RADIATION DAMAGE                |  |  |  |
| ...LASER DAMAGE                  |  |  |  |
| RT IONIZING RADIATION            |  |  |  |
| % IONIZATION                     |  |  |  |
| SINGLE EVENT UPSETS              |  |  |  |
|                                  |  |  |  |
| RADIATION DETECTORS              |  |  |  |
| O411 O508 1406 1410 2903         |  |  |  |
| GS MEASURING INSTRUMENTS         |  |  |  |

NUCLEAR RADIATION  
 NUCLEAR VULNERABILITY  
 PARTICLE TRACKS  
 PHYSIOLOGICAL EFFECTS  
 POST-BLAST NUCLEAR RADIATION  
 POYNTING-ROBERTSON EFFECT  
 PRESERVING  
 % RADIATION  
 RADIOACTIVE CONTAMINANTS  
 SPACE BASED RADAR  
 STERILIZATION EFFECTS

RADIATION EMISSION  
 USE RADIATION

RADIATION EXPOSURE  
 USE RADIATION DOSAGE

RADIATION FIELDS  
 USE RADIATION DISTRIBUTION

RADIATION HARDENING  
 O411 1406  
 RT ANTENNAS  
 ELECTRONIC EQUIPMENT  
 % RADIATION

RADIATION HAZARDS  
 O401 0408 0411  
 GS HAZARDS  
 #RADIATION HAZARDS  
 RT DERMATITIS  
 DOSIMETERS  
 ELECTROMAGNETIC RADIATION  
 FALLOUT  
 FLUX DENSITY  
 HEALTH PHYSICS  
 IONIZING RADIATION  
 LASER DAMAGE  
 MUTATIONS  
 NUCLEAR EXPLOSION EFFECT  
 NUCLEAR EXPLOSIONS  
 NUCLEAR RADIATION  
 OCCUPATIONAL DISEASES  
 OPERATIONAL HAZARDS  
 % RADIATION  
 RADIOACTIVE CONTAMINANTS  
 RADIOACTIVE MATERIALS  
 RADIOACTIVE WASTES  
 RADIOACTIVITY  
 REACTOR SAFETY

RADIATION HEATING  
 USE RADIANT HEATING

RADIATION INJURIES  
 O408 0411  
 GS INJURIES  
 #RADIATION INJURIES  
 RADIATION EFFECTS  
 #RADIATION INJURIES  
 RT BURNS (INJURIES)  
 HEALTH PHYSICS  
 % RADIATION

RADIATION INTENSITY  
 USE RADIANT FLUX DENSITY

RADIATION LAWS  
 O710 2402 2902 2903  
 GS LAWS  
 #RADIATION LAWS  
 ..KIRCHHOFF LAW OF RADIATION  
 ..STEFAN-BOLTZMANN LAW  
 ..STOKES LAW OF RADIATION  
 RT ELECTROMAGNETIC RADIATION  
 QUANTUM THEORY  
 % RADIATION

RADIATION MEASUREMENT  
 1406 2402  
 RT DOSAGE  
 DOSIMETERS  
 IRRADIATION  
 % MEASUREMENT  
 % RADIATION  
 SENSITOMETRY

RADIATION MEASURING INSTRUMENTS  
 1406 1408 1410 1411 3007  
 UF PHOTOELECTROMAGNETIC DETECTORS  
 PHOTOSENSORS  
 RADIATION METERS  
 GS MEASURING INSTRUMENTS  
 #RADIATION MEASURING INSTRUMENTS  
 ..ACTINOMETERS  
 ...INFRARED SPECTROMETERS  
 ...PYRANOMETERS  
 ...RADIOMETERS  
 ...DICKE RADIOMETERS  
 ...INFRARED DETECTORS  
 ...INFRARED RADIOMETERS  
 ...INFRARED SCANNERS  
 ...MICROWAVE RADIOMETERS  
 ...PASSIVE L-BAND RADIOMETERS  
 ...PRESSURE MODULATOR RADIOMETERS  
 ...SPECTRORADIOMETERS  
 ...SOLAR SPECTROMETERS  
 ...SPECTROHELIOGRAPHS  
 ...SPECTROPHOTOMETERS

...INFRARED SPECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...ULTRAVIOLET DETECTORS  
 ...ULTRAVIOLET SPECTROMETERS  
 ...TOTAL OZONE MAPPING  
 SPECTROMETER  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...X RAY DETECTORS  
 ...BOLOMETERS  
 ...EBERT SPECTROMETERS  
 ...ELECTROSTATIC PROBES  
 ...FABRY-PEROT SPECTROMETERS  
 ...HODOSCOPES  
 ...INFRARED INSTRUMENTS  
 ...INFRARED DETECTORS  
 ...FLIR DETECTORS  
 ...INFRARED RADIOMETERS  
 ...INFRARED SCANNERS  
 ...INFRARED SPECTROMETERS  
 ...INFRARED SPECTROPHOTOMETERS  
 ...PHOTOMETERS  
 ...ELECTROPHOTOMETERS  
 ...ULTRAVIOLET SPECTROMETERS  
 ...TOTAL OZONE MAPPING  
 SPECTROMETER  
 ...ULTRAVIOLET SPECTROPHOTOMETERS  
 ...RADIATION COUNTERS  
 ...CERENKOV COUNTERS  
 ...ELECTRON COUNTERS  
 ...GEIGER COUNTERS  
 ...NEUTRON COUNTERS  
 ...NEUTRON SPECTROMETERS  
 ...PARTICLE TELESCOPES  
 ...PROPORTIONAL COUNTERS  
 ...QUANTUM COUNTERS  
 ...SCINTILLATION COUNTERS  
 ...SPARK CHAMBERS  
 ...RADIATION DETECTORS  
 ...DOSIMETERS  
 ...THRESHOLD DETECTORS  
 (DOSIMETERS)  
 ...GOLAY DETECTOR CELLS  
 ...SILICON RADIATION DETECTORS  
 ...RIOMETERS  
 RT % DETECTORS  
 EARTH RADIATION BUDGET EXPERIMENT  
 HEALTH PHYSICS  
 IONIZATION CHAMBERS  
 MONITORS  
 NUCLEAR EMULSIONS  
 OPTICAL MEASURING INSTRUMENTS  
 % RADIATION  
 SAFETY DEVICES  
 SOLAR INSTRUMENTS  
 VELA SATELLITES

# NASA THESAURUS HIERARCHICAL UPDATE

## VIEW EFFECTS

RADIATION MEDICINE  
USE NUCLEAR MEDICINE

RADIATION METEOROID SPACECRAFT  
3001 3005 3009 3110  
RT METEOROID  
% RADIATION  
% SPACECRAFT  
SPACECRAFT CONFIGURATIONS

RADIATION METERS  
USE RADIATION MEASURING INSTRUMENTS

RADIATION NOISE  
USE ELECTROMAGNETIC NOISE

RADIATION PRESSURE  
O101 1408 2902  
SN (DYNES/SQ CM AS DISTINGUISHED FROM  
RADIANT FLUX DENSITY--DYNES/CM-SEC)  
GS

PRESSURE  
#RADIATION PRESSURE  
...ELECTRON PRESSURE  
...LUMENS  
...LUMINOUS INTENSITY  
...ILLUMINANCE  
...LUMINANCE  
...SOUND PRESSURE

RT BAROCLINIC WAVES  
BESSEL-BREDICHIN THEORY  
COMET TAILS  
CORPUSCULAR RADIATION  
ELASTIC WAVES

ELECTROMAGNETIC RADIATION  
KHOUTEK COMET  
PARTICLE FLUX DENSITY  
PERTURBATION  
PHOTOPHORESIS  
RADIANT FLUX DENSITY  
% RADIATION

SOLAR FLUX DENSITY  
SOLAR RADIATION  
SOLAR WIND  
STELLAR WINDS

RADIATION PROTECTION  
O411 0508 3305  
GS PROTECTION  
#RADIATION PROTECTION  
...RADIATION SHIELDING  
...SOLAR RADIATION SHIELDING  
RT ANTIRADIATION DRUGS  
CYSTEAMINE

HEALTH PHYSICS  
% RADIATION

SYNCHROTRON RADIATION  
THERMAL PROTECTION  
VISORS

RADIATION PYROMETERS  
1408 3501  
GS MEASURING INSTRUMENTS  
TEMPERATURE MEASURING INSTRUMENTS  
...PYROMETERS  
...#RADIATION PYROMETERS  
RT BOLOMETERS  
CIRCUMSOLAR TELESCOPES  
OPTICAL PYROMETERS  
% RADIATION  
TEMPERATURE MEASUREMENT  
THERMOCOUPLE PYROMETERS

RADIATION RESISTANCE  
USE RADIATION TOLERANCE  
O508 1802 3110 3305  
UF NUCLEAR SHIELDING  
GS PROTECTION  
...RADIATION PROTECTION  
...#RADIATION SHIELDING  
SHIELDING  
...SOLAR RADIATION SHIELDING

RT SOLAR RADIATION SHIELDING  
ABSORBERS (MATERIALS)  
ATTENUATORS  
BORAL

ELECTROMAGNETIC ABSORPTION  
ELECTROMAGNETIC SHIELDING  
GAMMA RAYS  
% INSULATED STRUCTURES  
MAGNETIC SHIELDING  
NEUTRON ABSORBERS  
NEUTRON FLUX DENSITY  
NEUTRONS  
NUCLEAR REACTORS  
PROTONS

% RADIATION  
RADIO FREQUENCY SHIELDING  
REACTOR MATERIALS  
REFLECTORS  
SAFETY DEVICES  
SPACE BASED RADAR  
SPACECRAFT SHIELDING  
STOPPING POWER  
TOWER SHIELDING REACTOR 2

RADIATION SICKNESS  
O401 0405 0408 0411  
GS DISEASES  
#RADIATION SICKNESS  
RT ANTIRADIATION DRUGS  
DERMATITIS  
HEALTH PHYSICS  
% RADIATION  
RADIOPATHOLOGY

RADIATION SOURCES  
2402 2403 2406 2902 3304  
UF COHERENT SOURCES  
GS #RADIATION SOURCES  
...MONOCHROMATORS  
...NEUTRON SOURCES  
...POINT SOURCES  
RT CORPUSCULAR RADIATION

DUOCHROMATORS  
ELECTROMAGNETIC RADIATION  
ELECTRON SOURCES  
EXTRAGALACTIC RADIO SOURCES  
% GENERATORS  
HEAT SOURCES  
INTERSTELLAR MASERS  
ION SOURCES  
LIGHT SOURCES  
PULSARS

% RADIATION  
RADIO SOURCES (ASTRONOMY)  
RADIOACTIVE MATERIALS  
SOUND GENERATORS  
% SOURCES  
X RAY STARS

RADIATION SPECTRA  
1411 2402 2406 2902 2903  
GS SPECTRA  
#RADIATION SPECTRA  
...ABSORPTION SPECTRA  
...FRAUNHOFER LINES  
...HERZBERG BANDS  
...TELLURIC LINES  
...ELECTROMAGNETIC SPECTRA  
...GAMMA RAY SPECTRA  
...INFRARED SPECTRA  
...LINE SPECTRA  
...BALMER SERIES  
...D LINES  
...ELECTRONIC SPECTRA  
...FRAUNHOFER LINES  
...H LINES  
...H ALPHA LINE  
...H BETA LINE  
...H GAMMA LINE

....K LINES  
 ....LYMAN SPECTRA  
 ....PASCHEN SERIES  
 ....RYDBERG SERIES  
 ....TELLURIC LINES  
 ....RADIO SPECTRA  
 ....MICROWAVE SPECTRA  
 ....RAMAN SPECTRA  
 ....STELLAR SPECTRA  
 ....SOLAR SPECTRA  
 ....UBV SPECTRA  
 ....ULTRAVIOLET SPECTRA  
 ....VIBRATIONAL SPECTRA  
 ....VISIBLE SPECTRUM  
 ....X RAY SPECTRA  
 ..EMISSION SPECTRA  
 ASTRONOMICAL SPECTROSCOPY  
 COSMIC BACKGROUND EXPLORER  
 SATELLITE  
 ENERGY SPECTRA  
 MASS SPECTRA  
 NOISE SPECTRA  
 PLASMA SPECTRA  
 % RADIATION

RT

RADIATION THERAPY

O405 O411

UF RADIOTHERAPY

GS THERAPY

#RADIATION THERAPY

RT CANCER

MEDICAL SCIENCE

PATHOLOGY

% RADIATION

RADIATION TOLERANCE

O411 1406

UF RADIATION RESISTANCE

GS SENSITIVITY

#RADIATION TOLERANCE

TOLERANCES (PHYSIOLOGY)

#RADIATION TOLERANCE

RT HUMAN TOLERANCES

IRRADIATION

% RADIATION

% RESISTANCE

TOLERANCES (MECHANICS)

RADIATION TRANSPORT

O301

RT EXPLODING WIRES

% RADIATION

RADIATIVE TRANSFER

TRANSPORT PROPERTIES

RADIATION TRAPPING

2402

RT

ARGON

EARTH MAGNETOSPHERE

EXCITATION

METASTABLE STATE

PLASMA PHYSICS

% RADIATION

RADIATIVE HEAT TRANSFER

1803 2402 3303 3501

GS RADIATIVE TRANSFER

#RADIATIVE HEAT TRANSFER

TRANSMISSION

.HEAT TRANSMISSION

..HEAT TRANSFER

..#RADIATIVE HEAT TRANSFER

CONCENTRATORS

CONVECTIVE HEAT TRANSFER

COOLING FINS

HEAT RADIATORS

INFRARED REFLECTION

NEAR INFRARED RADIATION

RADIANT COOLING

RADIANT HEATING

SATELLITE TEMPERATURE

SPACECRAFT RADIATORS

STEFAN-BOLTZMANN LAW

SURFACE COOLING

THERMOHYDRAULICS

TROMBE WALLS

VIEW EFFECTS

RADIATIVE LIFETIME

2404

RT

DECAY

HALF LIFE

RADIATIVE RECOMBINATION

O602 O605 2402

GS RECOMBINATION REACTIONS

.ELECTRON RECOMBINATION

.#RADIATIVE RECOMBINATION

.ELECTRON-ION RECOMBINATION

.#RADIATIVE RECOMBINATION

RT AIRGLOW

ATOMIC RECOMBINATION

CARRIER INJECTION

DEIONIZATION

LIGHTNING

RADIATIVE TRANSFER

2311 2402 3303 2903 3501

GS #RADIATIVE TRANSFER

.RADIATIVE HEAT TRANSFER

ATMOSPHERIC CORRECTION

COSMIC RAYS

ELECTROMAGNETIC RADIATION

ENERGY TRANSFER

EXTRATERRESTRIAL RADIATION

GALACTIC RADIATION

HEAT TRANSFER

HEAT TRANSMISSION

INTERSTELLAR RADIATION

NEAR INFRARED RADIATION

PLANETARY ATMOSPHERES

POLARIZED ELECTROMAGNETIC RADIATION

RADIANT HEATING

% RADIATION

RADIATION TRANSPORT

RADIO BURSTS

RADIO STARS

SOLAR RADIATION

STELLAR ATMOSPHERES

STELLAR RADIATION

% RADIATORS

2402 2406 3303 3501

SN (USE OF A MORE SPECIFIC TERM IS

RECOMMENDED--CONSULT THE TERMS

LISTED BELOW)

RT ANTENNAS

HEAT RADIATORS

SOUND TRANSDUCERS

THERMOSIPHONS

RADICALS

O603 O604 2406

GS #RADICALS

.AMINO RADICAL

.FORMYL IONS

.FREE RADICALS

..HYDROXYL RADICALS

.METHYLIDYNE

.VANADYL RADICAL

.VINYL RADICAL

RT % ROOTS

RADII

1902

UF

GS RADIUS

DIMENSIONS

#RADII

..LARMOR RADIUS

GEOMETRY

.EUCLIDEAN GEOMETRY

.#RADII

...LARMOR RADIUS

CIRCLES (GEOMETRY)

RT

|                               |  |
|-------------------------------|--|
| CIRCUMFERENCES                |  |
| DIAMETERS                     |  |
| LINES (GEOMETRY)              |  |
| RADIO FREQUENCIES             |  |
| SEGMENTS                      |  |
|                               |  |
| RADIO ALTIMETERS              |  |
| 0705 1401 1402 1407           |  |
| UF RADAR ALTIMETERS           |  |
| GS FLIGHT INSTRUMENTS         |  |
| #RADIO ALTIMETERS             |  |
| MEASURING INSTRUMENTS         |  |
| .DISTANCE MEASURING EQUIPMENT |  |
| ..ALTIMETERS                  |  |
| ..#RADIO ALTIMETERS           |  |
| RT AIRCRAFT INSTRUMENTS       |  |
| AUTOMATIC PILOTS              |  |
| INSTRUMENT LANDING SYSTEMS    |  |
| RADAR MEASUREMENT             |  |
|                               |  |
| RADIO ANTENNAS                |  |
| 0701 0705 0901                |  |
| GS ANTENNAS                   |  |
| #RADIO ANTENNAS               |  |
| ..MICROWAVE ANTENNAS          |  |
| ..HORN ANTENNAS               |  |
| ..LENS ANTENNAS               |  |
| ...SPACETENNAS                |  |
| RADIO EQUIPMENT               |  |
| #RADIO ANTENNAS               |  |
| ..MICROWAVE ANTENNAS          |  |
| ..HORN ANTENNAS               |  |
| ..LENS ANTENNAS               |  |
| ...SPACETENNAS                |  |
| RT AIRCRAFT ANTENNAS          |  |
| BACKFIRE ANTENNAS             |  |
| DIRECTIONAL ANTENNAS          |  |
| OMNIDIRECTIONAL ANTENNAS      |  |
| RECEPTION DIVERSITY           |  |
| REFLECTOR ANTENNAS            |  |
| RHOMBIC ANTENNAS              |  |
| SATELLITE ANTENNAS            |  |
| SCHWARZSCHILD ANTENNAS        |  |
| TWO REFLECTOR ANTENNAS        |  |
| WHIP ANTENNAS                 |  |
|                               |  |
| RADIO ASTRONOMY               |  |
| 1411 1412 3001                |  |
| GS ASTRONOMY                  |  |
| #RADIO ASTRONOMY              |  |
| ASTRONOMICAL INTERFEROMETRY   |  |
| ASTRONOMICAL OBSERVATORIES    |  |
| ASTRONOMICAL SPECTROSCOPY     |  |
| BRIGHTNESS DISTRIBUTION       |  |
| BRIGHTNESS TEMPERATURE        |  |

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## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

...SOLAR RADIO EMISSION  
 ....SOLAR RADIO BURSTS  
 .....TYPE 2 BURSTS  
 .....TYPE 3 BURSTS  
 .....TYPE 4 BURSTS  
 .....TYPE 5 BURSTS  
 EMISSION  
 #RADIO EMISSION  
 ..CN EMISSION  
 ..HYDROXYL EMISSION  
 ..RADIO BURSTS  
 ...SOLAR RADIO BURSTS  
 ....TYPE 2 BURSTS  
 ....TYPE 3 BURSTS  
 ....TYPE 4 BURSTS  
 ....TYPE 5 BURSTS  
 ...SOLAR RADIO EMISSION  
 ...SOLAR RADIO BURSTS  
 ....TYPE 2 BURSTS  
 ....TYPE 3 BURSTS  
 ....TYPE 4 BURSTS  
 ....TYPE 5 BURSTS  
 RT EXTRAGALACTIC RADIO SOURCES  
 EXTRATERRESTRIAL RADIO WAVES  
 QUASARS  
 RADIO JETS (ASTRONOMY)

RADIO EQUIPMENT  
 0701 0705 0905  
 GS #RADIO EQUIPMENT  
 .RADIO ANTENNAS  
 ..MICROWAVE ANTENNAS  
 ...HORN ANTENNAS  
 ...LENS ANTENNAS  
 ...SPACETENNAS  
 .RADIO FILTERS  
 ..SUPERHETERODYNE RECEIVERS  
 ..TRANSMITTER RECEIVERS  
 ..WHISTLER RECORDERS  
 .RADIO TELESCOPES  
 ..KILOMETER WAVE ORBITING TELESCOPE  
 ..VERY LARGE ARRAY (VLA)  
 ..VERY LONG BASELINE ARRAY (VLBA)  
 .RADIO TRANSMITTERS  
 ..RADIO BEACONS  
 ...OMNIDIRECTIONAL RADIO RANGES  
 ...SELF CALIBRATING OMNIRANGE  
 ...RADIO METEOROLOGRAPH  
 ...RADIOSONDES  
 ...ENDORADIOSONDES  
 ...IONOSONDES  
 ...RAWINSONDES  
 ...RADIO TELEPHONES  
 ...SONOBUOYS

...TRANSMITTER RECEIVERS  
 .RECEPTION DIVERSITY  
 .SPACECRAFT ANTENNAS  
 .TRANSPONDERS  
 .VERY HIGH FREQUENCY RADIO EQUIPMENT  
 RT AIRBORNE EQUIPMENT  
 ANTENNAS  
 BROADCASTING  
 COMMUNICATION EQUIPMENT  
 CRYSTAL FILTERS  
 CYLINDRICAL ANTENNAS  
 JAMMERS  
 NEAR FIELDS  
 ONBOARD EQUIPMENT  
 RADAR EQUIPMENT

RADIO FILTERS  
 0701 0705 0905  
 GS ELECTROMAGNETIC WAVE FILTERS  
 .ELECTRIC FILTERS  
 .#RADIO FILTERS  
 RADIO EQUIPMENT  
 #RADIO FILTERS  
 RT CRYSTAL FILTERS  
 % FILTERS  
 INTERFERENCE GRATING  
 MICROWAVE FILTERS  
 RADAR FILTERS

RADIO FREQUENCIES  
 0705 0710 1406 2309 2402  
 GS FREQUENCIES  
 #RADIO FREQUENCIES  
 ..EXTREMELY LOW RADIO FREQUENCIES  
 ..HIGH FREQUENCIES  
 ..LOW FREQUENCIES  
 ...VERY LOW FREQUENCIES  
 ...LOW FREQUENCY BANDS  
 ...VERY LOW FREQUENCIES  
 ...MICROWAVE FREQUENCIES  
 ...C BAND  
 ...EXTREMELY HIGH FREQUENCIES  
 ...P BAND  
 ...SUPERHIGH FREQUENCIES  
 ...ULTRAHIGH FREQUENCIES  
 ...P BAND  
 ...VERY HIGH FREQUENCIES  
 ...P BAND  
 AUDIO FREQUENCIES  
 CARRIER FREQUENCIES  
 EXTREMELY LOW FREQUENCIES  
 INTERMEDIATE FREQUENCIES  
 RADIO

RADIO FREQUENCY DISCHARGE  
 0705 0710 2402  
 GS ELECTRIC CURRENT  
 .ELECTRIC DISCHARGES  
 .#RADIO FREQUENCY DISCHARGE  
 ELECTRODELESS DISCHARGES  
 RT ELECTRON EMISSION  
 RING DISCHARGE

RADIO FREQUENCY HEATING  
 2402 2502 3303  
 GS HEATING  
 #RADIO FREQUENCY HEATING  
 RT INDUCTION HEATING  
 PLASMA HEATING

RADIO FREQUENCY IMPEDANCE PROBES  
 2402 3108  
 GS MEASURING INSTRUMENTS  
 .IMPEDANCE PROBES  
 .#RADIO FREQUENCY IMPEDANCE PROBES  
 IMPEDANCE MEASUREMENT  
 RT ION PROBES  
 MICROWAVE PROBES  
 PLASMA PROBES

RADIO FREQUENCY INTERFERENCE  
 0704 0705 3501  
 UF RADIO INTERFERENCE  
 GS ELECTROMAGNETIC INTERFERENCE  
 #RADIO FREQUENCY INTERFERENCE  
 ..BLACKOUT (PROPAGATION)  
 ...POLAR RADIO BLACKOUT  
 ...CHIRP  
 ...CHIRP SIGNALS  
 ...ELECTROMAGNETIC NOISE  
 ...ATMOSPHERICS  
 ...IONOSPHERICS  
 ...DAWN CHORUS  
 ...HISS  
 ...SUDDEN ENHANCEMENT OF ATMOSPHERICS  
 ...WHISTLERS  
 ...COSMIC NOISE  
 ...IONOSPHERIC NOISE  
 ...WHISTLERS  
 ...SHOT NOISE  
 ...WHITE NOISE  
 ...THERMAL NOISE  
 ...IONOSPHERIC CROSS MODULATION  
 CLUTTER  
 CROSS COUPLING  
 ELECTROMAGNETIC COMPATIBILITY  
 ELECTRONIC COUNTERMEASURES  
 ELECTRONIC WARFARE

| DESCRIPTION                          | RT | ASTROPHYSICS                         | AIR TRAFFIC CONTROL          |
|--------------------------------------|----|--------------------------------------|------------------------------|
| EXTRATERRESTRIAL RADIO WAVES         |    |                                      |                              |
| % INTERFERENCE                       |    | ORION (RADIO INTERFEROMETRY NETWORK) | AIRCRAFT GUIDANCE            |
| INTERFERENCE GRATING                 |    | VERY LONG BASE INTERFEROMETRY        | ALL-WEATHER AIR NAVIGATION   |
| INTERFERENCE IMMUNITY                |    |                                      | ASTRONAVIGATION              |
| JAMMING                              |    |                                      | AUTOMATIC FLIGHT CONTROL     |
| NOISE GENERATORS                     |    |                                      | CELESTIAL NAVIGATION         |
| NOISE STORMS                         |    |                                      | COLLISION AVOIDANCE          |
| SIGNAL FADING                        |    |                                      | DEAD RECKONING               |
|                                      |    |                                      | DISTANCE MEASURING EQUIPMENT |
| RADIO FREQUENCY ION THRUSTOR ENGINES |    |                                      | DOPPLER NAVIGATION           |
| USE RT ENGINES                       |    |                                      | FLIGHT CONTROL               |
|                                      |    |                                      | GUIDANCE (MOTION)            |
| RADIO FREQUENCY NOISE                |    |                                      | HOMING DEVICES               |
| USE ELECTROMAGNETIC NOISE            |    |                                      | INERTIAL NAVIGATION          |
|                                      |    |                                      | INTERPLANETARY NAVIGATION    |
| RADIO FREQUENCY RADIATION            |    |                                      | NAVIGATION AIDS              |
| USE RADIO WAVES                      |    |                                      | OMNIDIRECTIONAL RADIO RANGES |
|                                      |    |                                      | POSITIONING                  |
| RADIO FREQUENCY SHIELDING            |    |                                      | RADAR NAVIGATION             |
| 0701 0705 2402                       |    |                                      | SATELLITE NAVIGATION SYSTEMS |
| GS SHIELDING                         |    |                                      | SOLAR COMPASSES              |
| .ELECTROMAGNETIC SHIELDING           |    |                                      | SPACE NAVIGATION             |
| .#RADIO FREQUENCY SHIELDING          |    |                                      | SURFACE NAVIGATION           |
| RADIATION SHIELDING                  |    |                                      |                              |
| SPACECRAFT SHIELDING                 |    |                                      |                              |
|                                      |    |                                      |                              |
| RT                                   |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO GALAXIES                       |    |                                      |                              |
| 0708 0710 3001                       |    |                                      |                              |
| GS CELESTIAL BODIES                  |    |                                      |                              |
| .GALAXIES                            |    |                                      |                              |
| ..ACTIVE GALAXIES                    |    |                                      |                              |
| ..#RADIO GALAXIES                    |    |                                      |                              |
| ..EXTRAGALACTIC RADIO SOURCES        |    |                                      |                              |
| ..#RADIO GALAXIES                    |    |                                      |                              |
| ACTIVE GALACTIC NUCLEI               |    |                                      |                              |
| BLAZARS                              |    |                                      |                              |
| DISK GALAXIES                        |    |                                      |                              |
| MAFFEI GALAXIES                      |    |                                      |                              |
| QUASARS                              |    |                                      |                              |
|                                      |    |                                      |                              |
| RT                                   |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO METEORS                        |    |                                      |                              |
| 0705 3005                            |    |                                      |                              |
| GS CELESTIAL BODIES                  |    |                                      |                              |
| .METEORIDS                           |    |                                      |                              |
| .#RADIO METEORS                      |    |                                      |                              |
| ATMOSPHERIC IONIZATION               |    |                                      |                              |
| METEOR TRAILS                        |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO NAVIGATION                     |    |                                      |                              |
| 0202 0705 1402 1703 2102 2103        |    |                                      |                              |
| GS NAVIGATION                        |    |                                      |                              |
| #RADIO NAVIGATION                    |    |                                      |                              |
| ..HYPERBOLIC NAVIGATION              |    |                                      |                              |
| ..DECCA NAVIGATION                   |    |                                      |                              |
| ..LORAC NAVIGATION SYSTEM            |    |                                      |                              |
| ..LORAN                              |    |                                      |                              |
| ..LORAN C                            |    |                                      |                              |
| ..LORAN D                            |    |                                      |                              |
| ..SHORAN                             |    |                                      |                              |
| ..TACAN                              |    |                                      |                              |
| ..VHF OMNIRANGE NAVIGATION           |    |                                      |                              |
|                                      |    |                                      |                              |
| RT                                   |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO INTERFERENCE                   |    |                                      |                              |
| USE RADIO FREQUENCY INTERFERENCE     |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO INTERFEROMETERS                |    |                                      |                              |
| 0705 0709 1109 1405 2903             |    |                                      |                              |
| GS MEASURING INSTRUMENTS             |    |                                      |                              |
| .INTERFEROMETERS                     |    |                                      |                              |
| .#RADIO INTERFEROMETERS              |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO OBSERVATION                    |    |                                      |                              |
| 0705 0709 3009                       |    |                                      |                              |
| RT OBSERVATION                       |    |                                      |                              |
| SPACE OBSERVATIONS (FROM EARTH)      |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO OCCULTATION                    |    |                                      |                              |
| 1902 3108 2903                       |    |                                      |                              |
| GS OCCULTATION                       |    |                                      |                              |
| #RADIO OCCULTATION                   |    |                                      |                              |
| RT ATMOSPHERIC COMPOSITION           |    |                                      |                              |
| ATMOSPHERIC PRESSURE                 |    |                                      |                              |
| ATMOSPHERIC TEMPERATURE              |    |                                      |                              |
| PLANETARY ATMOSPHERES                |    |                                      |                              |
| SPACE PROBES                         |    |                                      |                              |
| SPACECRAFT TRAJECTORIES              |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO PHYSICS                        |    |                                      |                              |
| 2402                                 |    |                                      |                              |
| RT % PHYSICS                         |    |                                      |                              |
| % SCIENCE                            |    |                                      |                              |
| THEORETICAL PHYSICS                  |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO PROBING                        |    |                                      |                              |
| 0705 0708                            |    |                                      |                              |
| RT MEASURING INSTRUMENTS             |    |                                      |                              |
| % PROBES                             |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO PROPAGATION                    |    |                                      |                              |
| USE RADIO TRANSMISSION               |    |                                      |                              |
|                                      |    |                                      |                              |
| RADIO RANGE                          |    |                                      |                              |



# NASA THESAURUS HIERARCHICAL UPDATE

|                                   |                                   |                     |                              |
|-----------------------------------|-----------------------------------|---------------------|------------------------------|
| 0702 0705 0710                    | RADIO RELAY SYSTEMS               |                     |                              |
| SN (EXCLUDES RADIO BEACONS)       | 0702 0705 0710 0901 0905          |                     | ...RADIO JETS (ASTRONOMY)    |
| GS DISTANCE                       | GS TELECOMMUNICATION              |                     | ..QUASARS                    |
| #RADIO RANGE                      | .RADIO COMMUNICATION              |                     | ..RADIO STARS                |
| RANGE (EXTREMES)                  | .#RADIO RELAY SYSTEMS             | RT                  | ...PULSARS                   |
| .FREQUENCY RANGES                 | ...CODE DIVISION MULTIPLE ACCESS  |                     | BL LACERTAE OBJECTS          |
| .#RADIO RANGE                     | ...TIME DIVISION MULTIPLE ACCESS  |                     | BLAZARS                      |
| RT RADAR RANGE                    | COMMUNICATION EQUIPMENT           |                     | CN EMISSION                  |
|                                   | COMMUNICATION SATELLITES          |                     | EXTRATERRESTRIAL RADIO WAVES |
|                                   | DATA LINKS                        |                     | GALACTIC NUCLEI              |
| RADIO RANGES                      | DEFENSE COMMUNICATIONS SATELLITE  |                     | GALAXIES                     |
| USE RADIO BEACONS                 | SYSTEM                            |                     | HYDROXYL EMISSION            |
|                                   | EARTH TERMINAL MEASUREMENT SYSTEM |                     | IRREGULAR GALAXIES           |
| RADIO RECEIVERS                   | EARTH TERMINALS                   |                     | MAFFEI GALAXIES              |
| 0701 0705 0901 0904               | GLOBAL TRACKING NETWORK           |                     | MILKY WAY GALAXY             |
| GS COMMUNICATION EQUIPMENT        | MOLNIYA SATELLITES                |                     | RADIATION SOURCES            |
| #RADIO RECEIVERS                  | MSAT                              |                     | % SOURCES                    |
| ...SUPERHETERODYNE RECEIVERS      | ORBIT SPECTRUM UTILIZATION        |                     |                              |
| ..TRANSMITTER RECEIVERS           | % RELAY                           | RADIO SPECTRA       |                              |
| ..WHISTLER RECORDERS              | % SYSTEMS                         | 0705 2402 3009      |                              |
| RADIO EQUIPMENT                   | TDR SATELLITES                    | GS SPECTRA          |                              |
| #RADIO RECEIVERS                  |                                   |                     | .RADIATION SPECTRA           |
| ..SUPERHETERODYNE RECEIVERS       |                                   |                     | ..ELECTROMAGNETIC SPECTRA    |
| ..TRANSMITTER RECEIVERS           |                                   |                     | ..#RADIO SPECTRA             |
| ..WHISTLER RECORDERS              |                                   |                     | ...MICROWAVE SPECTRA         |
| RECEIVERS                         |                                   | RT                  | CARRIER WAVES                |
| #RADIO RECEIVERS                  |                                   |                     | ELECTROMAGNETIC NOISE        |
| ..SUPERHETERODYNE RECEIVERS       |                                   |                     | H I REGIONS                  |
| ..TRANSMITTER RECEIVERS           |                                   |                     | RADIANT FLUX DENSITY         |
| ..WHISTLER RECORDERS              |                                   |                     |                              |
| RT DATA LINKS                     |                                   |                     |                              |
| DIRECTORS (ANTENNA ELEMENTS)      |                                   |                     | RADIO SPECTROSCOPY           |
| ELECTROMAGNETIC NOISE             |                                   | 0705 1411 2402 3009 |                              |
| INTERMEDIATE FREQUENCY AMPLIFIERS |                                   | GS SPECTROSCOPY     |                              |
| LOUDSPEAKERS                      |                                   | #RADIO SPECTROSCOPY |                              |
| ORION (RADIO INTERFEROMETRY       |                                   | RT                  | ASTRONOMICAL SPECTROSCOPY    |
| NETWORK)                          |                                   |                     | ULTRAVIOLET SPECTRA          |
| PARASITIC ELEMENTS (ANTENNAS)     |                                   |                     | ULTRAVIOLET SPECTROSCOPY     |
| RADAR RECEIVERS                   |                                   |                     | X RAY SPECTROSCOPY           |
| RECEPTION DIVERSITY               |                                   |                     |                              |
| TELEVISION RECEPTION              |                                   |                     |                              |
| TRANSPONDERS                      |                                   |                     |                              |
| TUNERS                            |                                   |                     |                              |
|                                   |                                   |                     |                              |
| RADIO RECEPTION                   |                                   |                     |                              |
| 0705 0710 2402                    |                                   |                     |                              |
| RT HOMODYNE RECEPTION             |                                   |                     |                              |
| RADAR RECEPTION                   |                                   |                     |                              |
| % RECEIVING                       |                                   |                     |                              |
| RECEPTION DIVERSITY               |                                   |                     |                              |
| SCATTER PROPAGATION               |                                   |                     |                              |
| TELEVISION RECEPTION              |                                   |                     |                              |
|                                   |                                   |                     |                              |
| RADIO REFLECTION                  |                                   |                     |                              |
| USE RADIO ECHOES                  |                                   |                     |                              |

[illegible]

|    |                                    |
|----|------------------------------------|
| UF | RADIO FREQUENCY RADIATION          |
| GS | ELECTROMAGNETIC RADIATION          |
|    | #RADIO WAVES                       |
|    | ..DECAHETERIC WAVES                |
|    | ..EXTRAHERTERIAL RADIO WAVES       |
|    | ...GALACTIC RADIO WAVES            |
|    | ....RADIO BURSTS                   |
|    | .....SOLAR RADIO BURSTS            |
|    | .....TYPE 2 BURSTS                 |
|    | .....TYPE 3 BURSTS                 |
|    | .....TYPE 4 BURSTS                 |
|    | .....TYPE 5 BURSTS                 |
|    | ...SOLAR RADIO EMISSION            |
|    | ....TYPE 2 BURSTS                  |
|    | ....TYPE 3 BURSTS                  |
|    | ....TYPE 4 BURSTS                  |
|    | ....TYPE 5 BURSTS                  |
|    | ..LONG WAVE RADIATION              |
|    | ...RADIO EMISSION                  |
|    | ....CN EMISSION                    |
|    | ....HYDROXYL EMISSION              |
|    | ....RADIO BURSTS                   |
|    | .....SOLAR RADIO BURSTS            |
|    | .....TYPE 2 BURSTS                 |
|    | .....TYPE 3 BURSTS                 |
|    | .....TYPE 4 BURSTS                 |
|    | .....TYPE 5 BURSTS                 |
|    | ...SOLAR RADIO EMISSION            |
|    | ....SOLAR RADIO BURSTS             |
|    | ....TYPE 2 BURSTS                  |
|    | ....TYPE 3 BURSTS                  |
|    | ....TYPE 4 BURSTS                  |
|    | ....TYPE 5 BURSTS                  |
|    | ..SHORT WAVE RADIATION             |
|    | ....MICROWAVES                     |
|    | .....CENTIMETER WAVES              |
|    | .....DECIMETER WAVES               |
|    | .....MICROWAVE EMISSION            |
|    | .....MILLIMETER WAVES              |
|    | ...SUBMILLIMETER WAVES             |
|    | ...SKY WAVES                       |
|    | ...WHISTLES                        |
| RT | ATMOSPHERICS                       |
|    | COHERENT ELECTROMAGNETIC RADIATION |
|    | ELECTROMAGNETIC NOISE              |
|    | ELECTROMAGNETIC SURFACE WAVES      |
|    | EXTRAHERTERIAL RADIATION           |
|    | FAR INFRARED RADIATION             |
|    | FREQUENCIES                        |
|    | GROUND WAVE PROPAGATION            |
|    | MONOCHROMATIC RADIATION            |
|    | MULTIPATH TRANSMISSION             |
|    | NONTHERMAL RADIATION               |
|    | PLANETARY RADIATION                |

POLARIZED ELECTROMAGNETIC RADIATION  
SCATTER PROPAGATION  
SOLAR RADIATION  
SOLITARY WAVES  
THERMAL RADIATION  
TRANSVERSE WAVES  
TRAVELING WAVES  
TROPOSPHERIC WAVES

RADIOACTIVE AGE DETERMINATION  
1306 1406 2406  
UF RADIOACTIVE DATING  
RT % AGING  
FOSSILS  
GEOCHRONOLOGY  
HALF LIFE  
% MEASUREMENT  
RADIOCHEMISTRY  
RADIOGENIC MATERIALS  
TIME MEASUREMENT

RADIOACTIVE CONTAMINANTS  
0401 0411 0505 2406  
GS CONTAMINANTS  
#RADIOACTIVE CONTAMINANTS  
RT ATMOSPHERIC COMPOSITION  
FALLOUT  
NUCLEAR RADIATION  
RADIATION EFFECTS  
RADIATION HAZARDS

RADIOACTIVE DATING  
USE RADIOACTIVE AGE DETERMINATION

% RADIOACTIVE DEBRIS  
1301 1302 2205 2406  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT DEBRIS  
FALLOUT  
RADIOACTIVE MATERIALS  
RADIOACTIVE WASTES  
RADIOGENIC MATERIALS

RADIOACTIVE DECAY  
2405 2406  
UF PARTICLE DECAY  
GS DECAY  
#RADIOACTIVE DECAY  
..ALPHA DECAY  
..NEUTRON EMISSION  
NUCLEAR REACTIONS  
#RADIOACTIVE DECAY  
..ALPHA DECAY

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..NEUTRON EMISSION
EMISSION
GAMMA RAY BEAMS
GAMMA RAYS
HALF LIFE
HYPERNUCLEI
NUCLEAR FISSION
NUCLEAR RADIATION
PHOTOPRODUCTION
POST-BLAST NUCLEAR RADIATION
RADIOACTIVITY
RADIOGENIC MATERIALS
THERMONUCLEAR REACTIONS
VECTOR CURRENTS

RADIOACTIVE ELEMENTS
USE RADIOACTIVE ISOTOPES

RADIOACTIVE ISOTOPES
2406
UF
RADIOACTIVE ELEMENTS
RADIOACTIVE NUCLIDES
RADIONUCLIDES
CHEMICAL ELEMENTS
..NUCLIDES
..ISOTOPES
..#RADIOACTIVE ISOTOPES
...ASTATINE ISOTOPES
...BERYLLIUM 7
...BERYLLIUM 9
...BERYLLIUM 10
...CARBON 14
...CERIUM 137
...CERIUM 144
...CESIUM 134
...CESIUM 137
...CESIUM 144
...COBALT 58
...COBALT 60
...GOLD 198
...INDIUM ISOTOPES
...IODINE 125
...IODINE 131
...IODINE 132
...IRON 59
...KRYPTON 85
...NIOBIUM 95
...NITROGEN 16
...PHOSPHORUS 32
...POLONIUM 208
...POLONIUM 209
...POLONIUM 210
...POTASSIUM 38
...POTASSIUM 40
...RUBIDIUM 86

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|                                         |  |                       |
|-----------------------------------------|--|-----------------------|
| ....SODIUM 22                           |  | % RADIATION           |
| ....SODIUM 24                           |  | RADIATION HAZARDS     |
| ....STRONTIUM 85                        |  | RADIOACTIVE DECAY     |
| ....STRONTIUM 88                        |  | RADIOACTIVE MATERIALS |
| ....STRONTIUM 89                        |  | RADIOCHEMISTRY        |
| ....STRONTIUM 90                        |  |                       |
| ....TRANSURANIUM ELEMENTS               |  |                       |
| ....AMERICIUM                           |  |                       |
| ....AMERICIUM ISOTOPES                  |  |                       |
| ....AMERICIUM 241                       |  |                       |
| ....BERKELIUM                           |  |                       |
| ....CALIFORNIUM                         |  |                       |
| ....CALIFORNIUM ISOTOPES                |  |                       |
| ....CURIUM                              |  |                       |
| ....CURIUM ISOTOPES                     |  |                       |
| ....CURIUM 242                          |  |                       |
| ....CURIUM 244                          |  |                       |
| ....EINSTEINIUM                         |  |                       |
| ....FERMIUM                             |  |                       |
| ....LAWRENCIUM                          |  |                       |
| ....MENDELEVIUM                         |  |                       |
| ....NEPTUNIUM                           |  |                       |
| ....NEPTUNIUM ISOTOPES                  |  |                       |
| ....NOBELIUM                            |  |                       |
| ....PLUTONIUM                           |  |                       |
| ....PLUTONIUM ISOTOPES                  |  |                       |
| ....PLUTONIUM 238                       |  |                       |
| ....PLUTONIUM 239                       |  |                       |
| ....PLUTONIUM 240                       |  |                       |
| ....PLUTONIUM 241                       |  |                       |
| ....PLUTONIUM 244                       |  |                       |
| ....SERGENIUM                           |  |                       |
| ....TRITIUM                             |  |                       |
| ....URANIUM 232                         |  |                       |
| ....URANIUM 233                         |  |                       |
| ....URANIUM 238                         |  |                       |
| ....XENON 133                           |  |                       |
| ....XENON 135                           |  |                       |
| ....ZIRCONIUM 95                        |  |                       |
| ACTINIDE SERIES                         |  |                       |
| ARSENIC ISOTOPES                        |  |                       |
| GOLD ISOTOPES                           |  |                       |
| ISOTOPE EFFECT                          |  |                       |
| ISOTOPIC LABELING                       |  |                       |
| RADIOCARDIOGRAPHY                       |  |                       |
| RADIOISOTOPE BATTERIES                  |  |                       |
| RADIOPHOSPHORS                          |  |                       |
| RHENIUM ISOTOPES                        |  |                       |
|                                         |  |                       |
| RADIOACTIVE MATERIALS                   |  |                       |
| 2203 2205 2406                          |  |                       |
| RT ACTINIDE SERIES                      |  |                       |
| FISSILE FUELS                           |  |                       |
| FISSION PRODUCTS                        |  |                       |
| FISSIONABLE MATERIALS                   |  |                       |
|                                         |  |                       |
| IONIZING RADIATION                      |  |                       |
| ISOTOPES                                |  |                       |
| MATERIALS                               |  |                       |
| NUCLEAR FISSION                         |  |                       |
| NUCLEAR RADIATION                       |  |                       |
| RADIATION HAZARDS                       |  |                       |
| RADIATION SOURCES                       |  |                       |
| RADIOACTIVE DEBRIS                      |  |                       |
| RADIOACTIVITY                           |  |                       |
| RADIOBIOLOGY                            |  |                       |
| RADIOCHEMISTRY                          |  |                       |
| URANIUM PLASMAS                         |  |                       |
|                                         |  |                       |
| RADIOACTIVE NUCLIDES                    |  |                       |
| USE RADIOACTIVE ISOTOPES                |  |                       |
|                                         |  |                       |
| RADIOACTIVE WASTES                      |  |                       |
| O505 O602 2402                          |  |                       |
| UF NUCLEAR WASTES                       |  |                       |
| GS WASTES                               |  |                       |
| #RADIOACTIVE WASTES                     |  |                       |
| CONTAMINATION                           |  |                       |
| DECLASSIFICATION                        |  |                       |
| ENVIRONMENT POLLUTION                   |  |                       |
| ENVIRONMENT PROTECTION                  |  |                       |
| ENVIRONMENTAL SURVEYS                   |  |                       |
| FISSION PRODUCTS                        |  |                       |
| HAZARDOUS MATERIAL DISPOSAL ( IN SPACE) |  |                       |
| NONPOINT SOURCES                        |  |                       |
| PLASMA CORE REACTORS                    |  |                       |
| POISONING (REACTION INHIBITION)         |  |                       |
| POLLUTION                               |  |                       |
| RADIATION HAZARDS                       |  |                       |
| RADIOACTIVE DEBRIS                      |  |                       |
| RADIOCHEMISTRY                          |  |                       |
| RADIOGENIC MATERIALS                    |  |                       |
| SOLID WASTES                            |  |                       |
| WASTE DISPOSAL                          |  |                       |
|                                         |  |                       |
| RADIOACTIVITY                           |  |                       |
| O411 2202 2401 2403 2405 2406 3408      |  |                       |
| RT % ACTIVITY                           |  |                       |
| ALPHA PARTICLES                         |  |                       |
| EMISSION                                |  |                       |
| FALLOUT                                 |  |                       |
| FISSION PRODUCTS                        |  |                       |
| GAMMA RAYS                              |  |                       |
| GEOCHEMISTRY                            |  |                       |
| GEOPHYSICS                              |  |                       |
| HALF LIFE                               |  |                       |
| IONIZING RADIATION                      |  |                       |
| NUCLEAR RADIATION                       |  |                       |
| PARTICLE PRODUCTION                     |  |                       |
| POST-BLAST NUCLEAR RADIATION            |  |                       |
|                                         |  |                       |
| IONIZING RADIATION                      |  |                       |
| ISOTOPIC LABELING                       |  |                       |
| NUCLEAR CHEMISTRY                       |  |                       |
| NUCLEAR RADIATION                       |  |                       |
| NUCLEAR RESEARCH                        |  |                       |
| RADIOACTIVE AGE DETERMINATION           |  |                       |
| RADIOACTIVE MATERIALS                   |  |                       |
| RADIOACTIVE WASTES                      |  |                       |
|                                         |  |                       |
| BIOENGINEERING                          |  |                       |
| .BIOMETRICS                             |  |                       |
| .#RADIOCARDIOGRAPHY                     |  |                       |
| CARDIOLOGY                              |  |                       |
| RADIOACTIVE ISOTOPES                    |  |                       |
|                                         |  |                       |
| RADIOCHEMICAL SEPARATION                |  |                       |
| O601                                    |  |                       |
| GS RADIOCHEMISTRY                       |  |                       |
| #RADIOCHEMICAL SEPARATION               |  |                       |
| CHEMICAL REACTIONS                      |  |                       |
| QUANTITATIVE ANALYSIS                   |  |                       |
| % SEPARATION                            |  |                       |
|                                         |  |                       |
| RADIOCHEMISTRY                          |  |                       |
| O603 2406                               |  |                       |
| UF REACTOR CHEMISTRY                    |  |                       |
| GS #RADIOCHEMISTRY                      |  |                       |
| .RADIOCHEMICAL SEPARATION               |  |                       |
| CHEMICAL ANALYSIS                       |  |                       |
| % CHEMISTRY                             |  |                       |
| IONIZING RADIATION                      |  |                       |
| ISOTOPIC LABELING                       |  |                       |
| NUCLEAR CHEMISTRY                       |  |                       |
| NUCLEAR RADIATION                       |  |                       |
| NUCLEAR RESEARCH                        |  |                       |
| RADIOACTIVE AGE DETERMINATION           |  |                       |
| RADIOACTIVE MATERIALS                   |  |                       |
| RADIOACTIVE WASTES                      |  |                       |

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RADIOACTIVITY  
 RADIOBIOLOGY  
 RADIOGENIC MATERIALS  
 1703 1807 2406  
 RT NUCLEAR REACTIONS  
 RADIOACTIVE AGE DETERMINATION  
 % RADIOACTIVE DEBRIS  
 RADIOACTIVE DECAY  
 RADIOACTIVE WASTES  
 TRANSMUTATION  
 RADIOGONIOMETERS  
 0705 0905 1409  
 GS MEASURING INSTRUMENTS  
 .GONIOMETERS  
 .#RADIOGONIOMETERS  
 RT RADIO DIRECTION FINDERS  
 RADIOGRAPHY  
 1407 2402 2406  
 UF CINEFLUOROGRAPHY  
 CINDERADIOGRAPHY  
 GS IMAGERY  
 #RADIOGRAPHY  
 ..ANGIOGRAPHY  
 ...AUTORADIOGRAPHY  
 ...NEUTRON RADIOGRAPHY  
 ...TOMOGRAPHY  
 ...COMPUTER AIDED TOMOGRAPHY  
 .UROGRAPHY  
 RT BRAGG ANGLE  
 CRYSTALLOGRAPHY  
 % FLASH  
 IRRADIATION  
 LIXISCOPES  
 % MATERIALS TESTS  
 METALLOGRAPHY  
 NONDESTRUCTIVE TESTS  
 PHOTOGRAPHY  
 PNEUMOGRAPHY  
 RADIOLOGY  
 X RAY ANALYSIS  
 X RAY APPARATUS  
 X RAY ASTRONOMY  
 X RAY DIFFRACTION  
 X RAY FLUORESCENCE  
 X RAY IMAGERY  
 X RAY INSPECTION  
 X RAY SPECTROSCOPY  
 X RAY TELESCOPES  
 X RAYS  
 RADIOIMMUNOASSAY

O404  
 GS IMMUNOASSAY  
 #RADIOIMMUNOASSAY  
 RT ANTIGENS  
 ASSAYING  
 BIOCHEMISTRY  
 IMMUNOLOGY  
 RADIOBIOLOGY  
 RADIOISOTOPE BATTERIES  
 O301  
 UF ATOMIC BATTERIES  
 GS ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .#RADIOISOTOPE BATTERIES  
 ...SNAP 7  
 ...SNAP 9A  
 ...SNAP 11  
 ...SNAP 13  
 ...SNAP 15  
 ...SNAP 17  
 ...SNAP 19  
 ...SNAP 21  
 ...SNAP 23  
 ...SNAP 27  
 ...SNAP 29  
 RT ELECTRIC BATTERIES  
 FISSION ELECTRIC CELLS  
 NUCLEAR AUXILIARY POWER UNITS  
 RADIOACTIVE ISOTOPE  
 THERMIONIC CONVERTERS  
 THERMOELECTRIC GENERATORS  
 RADIOLOGY  
 O401 O405 0411 2406  
 GS MEDICAL SCIENCE  
 #RADIOLOGY  
 RT AEROSPACE MEDICINE  
 % MEDICINE  
 % RADIATION  
 RADIOGRAPHY  
 X RAY ANALYSIS  
 X RAYS  
 RADIOLYSIS  
 O602 0603 2202 2406  
 GS CHEMICAL REACTIONS  
 .PHOTOCHEMICAL REACTIONS  
 .#RADIOLYSIS  
 DECOMPOSITION  
 #RADIOLYSIS  
 DISSOCIATION  
 #RADIOLYSIS  
 RADIATION CHEMISTRY  
 #RADIOLYSIS

RADIATION EFFECTS  
 #RADIOLYSIS  
 RT PHOTOLYSIS  
 RADIOMETEOROGRAPHS  
 0705 2003 2402 3005  
 GS MEASURING INSTRUMENTS  
 .METEOROLOGICAL INSTRUMENTS  
 .#RADIOMETEOROGRAPHS  
 RADIO EQUIPMENT  
 .RADIO TRANSMITTERS  
 .#RADIOMETEOROGRAPHS  
 RECORDING INSTRUMENTS  
 #RADIOMETEOROGRAPHS  
 TRANSMITTERS  
 .RADIO TRANSMITTERS  
 .#RADIOMETEOROGRAPHS  
 RT RADIO TELEMETRY  
 RADIOSONDES  
 RADIOMETERS  
 1404 1406 1407 1409 2402 3009 3501  
 GS MEASURING INSTRUMENTS  
 .RADIATION MEASURING INSTRUMENTS  
 ..ACTINOMETERS  
 ...#RADIOMETERS  
 ...DICKE RADIOMETERS  
 ...INFRARED DETECTORS  
 ...INFRARED RADIOMETERS  
 ...INFRARED SCANNERS  
 ...MICROWAVE RADIOMETERS  
 ...PASSIVE L-BAND RADIOMETERS  
 ...PRESSURE MODULATOR RADIOMETERS  
 ...SPECTORADIOMETERS  
 RT BOLOMETERS  
 FOREST FIRE DETECTION  
 HORIZON SCANNERS  
 INFRARED PHOTOGRAPHY  
 INFRARED TRACKING  
 KNUDSEN GAGES  
 PHOTOMETERS  
 PYRANOMETERS  
 RADIOMETRIC RESOLUTION  
 SPECTROPHOTOMETERS  
 THERMISTORS  
 ULTRAVIOLET DETECTORS  
 X RAY DETECTORS  
 RADIOMETRIC CORRECTION  
 1404  
 UF RADIOMETRIC RECTIFICATION  
 RT IMAGE ENHANCEMENT  
 INFRARED RADIOMETERS  
 MULTISPECTRAL BAND SCANNERS  
 VEGETATIVE INDEX

|                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RADIOMETRIC RECTIFICATION<br>USE RADIOMETRIC CORRECTION                                                                                                                                                                                                                                                                                                                                   | TRANSMITTERS<br>.RADIO TRANSMITTERS<br>..#RADIOSONDES<br>...ENDORADIOSONDES<br>...IONOSONDES<br>...RAWINSONDES                                                                                                                                                                                                                                                     | GS | CHEMICAL ELEMENTS<br>.ACTINIDE SERIES<br>..RADIUM<br>...RADIUM ISOTOPES<br>...RADIUM 226<br>.NUCLIDES<br>..ISOTOPES<br>...RADIUM ISOTOPES<br>...RADIUM 226<br>METALS<br>.ACTINIDE SERIES<br>..RADIUM<br>...RADIUM ISOTOPES<br>...RADIUM 226 |
| RADIOMETRIC RESOLUTION<br>1404<br>GS RESOLUTION<br>#RADIOMETRIC RESOLUTION<br>RT MULTISPECTRAL BAND SCANNERS<br>RADIOMETERS<br>REMOTE SENSORS<br>SPECTRAL RESOLUTION                                                                                                                                                                                                                      | RT<br>ARCAS ROCKET VEHICLES<br>BALLOON SOUNDING<br>BALLOON-BORNE INSTRUMENTS<br>DROPSONDES<br>METEOROLOGICAL BALLOONS<br>RADIO METEOROLOGY<br>RADIO TELEMETRY<br>RADIOMETEOROLOGRAPH<br>ROBIN BALLOONS<br>SATELLITE SOUNDING<br>SOUNDING ROCKETS                                                                                                                   |    |                                                                                                                                                                                                                                             |
| RADIONUCLIDES<br>USE RADIOACTIVE ISOTOPES                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                    |    | RADIUM 226<br>1703 2406<br>GS                                                                                                                                                                                                               |
| RADIOPATHOLOGY<br>0401 0405 0411<br>GS MEDICAL SCIENCE<br>#RADIOPATHOLOGY<br>RT ANTIRADIATION DRUGS<br>NUCLEAR MEDICINE<br>RADIATION SICKNESS                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                    |    | CHEMICAL ELEMENTS<br>.ACTINIDE SERIES<br>..RADIUM<br>...RADIUM ISOTOPES<br>...RADIUM 226<br>.NUCLIDES<br>..ISOTOPES<br>...RADIUM ISOTOPES<br>...RADIUM 226<br>METALS<br>.ACTINIDE SERIES<br>..RADIUM<br>...RADIUM ISOTOPES<br>...RADIUM 226 |
| RADIOPHOSPHORS<br>0603 0605 2406<br>GS PHOSPHORS<br>#RADIOPHOSPHORS<br>RT RADIOACTIVE ISOTOPES                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                             |
| RADIOPROTECTIVE AGENTS<br>USE ANTIRADIATION DRUGS                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                             |
| RADIOSENSITIVITY<br>USE RADIATION TOLERANCE                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                             |
| RADIOSONDES<br>0708 1413 2002 2003 2402<br>GS MEASURING INSTRUMENTS<br>.METEOROLOGICAL INSTRUMENTS<br>..#RADIOSONDES<br>...ENDORADIOSONDES<br>...IONOSONDES<br>...RAWINSONDES<br>..SONDES<br>..#RADIOSONDES<br>...ENDORADIOSONDES<br>...IONOSONDES<br>...RAWINSONDES<br>RADIO EQUIPMENT<br>.RADIO TRANSMITTERS<br>..#RADIOSONDES<br>...ENDORADIOSONDES<br>...IONOSONDES<br>...RAWINSONDES | RT<br>RADIOTELEPHONES<br>0702 0710 2402<br>GS RADIO EQUIPMENT<br>.RADIO TRANSMITTERS<br>..#RADIOTELEPHONES<br>RECEIVERS<br>#RADIOTELEPHONES<br>TELECOMMUNICATION<br>#RADIOTELEPHONES<br>TELEPHONES<br>#RADIOTELEPHONES<br>TRANSMITTERS<br>.RADIO TRANSMITTERS<br>..#RADIOTELEPHONES<br>ECHO SUPPRESSORS<br>RADIO COMMUNICATION<br>TELEPHONY<br>VOICE COMMUNICATION |    |                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                           | RT                                                                                                                                                                                                                                                                                                                                                                 |    | RADIUS<br>USE<br>RADI I                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                           | RADIOTHERAPY<br>USE RADIATION THERAPY                                                                                                                                                                                                                                                                                                                              |    | RADOME MATERIALS<br>0901 0903 0905<br>GS DIELECTRICS<br>#RADOME MATERIALS<br>RT ELECTROMAGNETIC WAVE TRANSMISSION<br>% MATERIALS<br>RADAR TRANSMISSION<br>RADIO TRANSMISSION<br>RADOMES<br>TRANSPARENCY                                     |
|                                                                                                                                                                                                                                                                                                                                                                                           | RADIUM<br>1703 2406<br>GS CHEMICAL ELEMENTS<br>.ACTINIDE SERIES<br>..#RADIUM<br>...RADIUM ISOTOPES<br>...RADIUM 226<br>METALS<br>.ACTINIDE SERIES<br>..#RADIUM<br>...RADIUM ISOTOPES<br>...RADIUM 226                                                                                                                                                              |    | RADOMES<br>0705 0901 0905<br>GS HOUSINGS<br>#RADOMES<br>SHELLS (STRUCTURAL FORMS)<br>.DOMES (STRUCTURAL FORMS)<br>..#RADOMES<br>RT INFLATABLE STRUCTURES<br>PROTUBERANCES                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                           | RADIUM ISOTOPES<br>1703 2406                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                             |



|            |                                 |                      |                                 |                 |                                   |
|------------|---------------------------------|----------------------|---------------------------------|-----------------|-----------------------------------|
| RT         | HALOS                           | RT                   | ANTIRADAR COATINGS              | RT              | SPECTROSCOPY                      |
|            | LIGHT TRANSMISSION              |                      | RAMS (PRESSES)                  | GS              | SPECTROSCOPY                      |
|            | RAIN                            |                      | RAMS (PUMPS)                    |                 | .MOLECULAR SPECTROSCOPY           |
|            |                                 |                      |                                 | RT              | .#RAMAN SPECTROSCOPY              |
| RAINDROPS  |                                 | RAM B LAUNCH VEHICLE |                                 |                 | ASTRONOMICAL SPECTROSCOPY         |
| 2003       |                                 | 3103                 |                                 |                 | INFRARED SPECTROSCOPY             |
| GS         | PARTICLES                       | GS                   | LAUNCH VEHICLES                 |                 | LINE SPECTRA                      |
|            | .DROPS (LIQUIDS)                |                      | #RAM B LAUNCH VEHICLE           |                 | OPTOGALVANIC SPECTROSCOPY         |
| RT         | .#RAINDROPS                     |                      | ROCKET VEHICLES                 |                 | RAYLEIGH SCATTERING               |
|            | DROP SIZE                       |                      | .MULTISTAGE ROCKET VEHICLES     |                 | SPECTROSCOPIC ANALYSIS            |
|            | FALLING SPHERES                 |                      | .#RAM B LAUNCH VEHICLE          |                 |                                   |
|            | RAIN                            | RT                   | SOLID PROPELLANT ROCKET ENGINES | RAMJET ENGINES  |                                   |
|            | RAINMAKING                      |                      | TX-354 ENGINE                   | 2805            |                                   |
|            |                                 |                      |                                 | UF              |                                   |
| RAINMAKING |                                 | RAM PROJECT          |                                 | GS              | ATHODYDS                          |
| 1301       | 1302 2001 2003 2311             | USE                  | RADIO ATTENUATION MEASUREMENT   |                 | ENGINES                           |
| GS         | WEATHER MODIFICATION            |                      | PROJECT                         |                 | .AIR BREATHING ENGINES            |
|            | #RAINMAKING                     |                      |                                 |                 | ..GAS TURBINE ENGINES             |
| RT         | CLIMATOLOGY                     | RAMAN EFFECT         |                                 |                 | ...JET ENGINES                    |
|            | CLOUD SEEDING                   | USE                  | RAMAN SPECTRA                   |                 | ...#RAMJET ENGINES                |
|            | PRECIPITATION (METEOROLOGY)     |                      |                                 |                 | .....INTEGRAL ROCKET RAMJETS      |
|            | RAINDROPS                       |                      |                                 |                 | .....LOW VOLUME RAMJET ENGINES    |
|            | WATER RESOURCES                 | RAMAN LASERS         |                                 |                 | .....PULSEJET ENGINES             |
|            |                                 | 1601                 |                                 |                 | .....SUPERSONIC COMBUSTION RAMJET |
| RAINSTORMS |                                 | GS                   | STIMULATED EMISSION DEVICES     |                 | ENGINES                           |
| 1301       | 2001 2003                       |                      | .LASERS                         |                 | .....TURBORAMJET ENGINES          |
| GS         | STORMS                          |                      | .#RAMAN LASERS                  |                 | ..INTERNAL COMBUSTION ENGINES     |
|            | .STORMS (METEOROLOGY)           | RAMAN SCATTERING     |                                 |                 | ..GAS TURBINE ENGINES             |
|            | .#RAINSTORMS                    | USE                  | RAMAN SPECTRA                   |                 | ...JET ENGINES                    |
|            | ...THUNDERSTORMS                |                      |                                 |                 | ...#RAMJET ENGINES                |
| RT         | ACID RAIN                       | RAMAN SPECTRA        |                                 |                 | .....INTEGRAL ROCKET RAMJETS      |
|            | FLOOD CONTROL                   | 1413                 | 2306 2310 2404 3009             |                 | .....LOW VOLUME RAMJET ENGINES    |
|            | FLOOD PREDICTIONS               | UF                   | RAMAN EFFECT                    |                 | .....PULSEJET ENGINES             |
|            | HAILSTORMS                      |                      | RAMAN SCATTERING                |                 | .....SUPERSONIC COMBUSTION RAMJET |
|            | PRECIPITATION (METEOROLOGY)     | GS                   | SCATTERING                      |                 | ENGINES                           |
|            | RAIN                            |                      | .WAVE SCATTERING                |                 | .....TURBORAMJET ENGINES          |
| %          | SHOWERS                         |                      | ..ELECTROMAGNETIC SCATTERING    |                 | ..TURBINE ENGINES                 |
|            | STORM DAMAGE                    |                      | ..#RAMAN SPECTRA                |                 | ..GAS TURBINE ENGINES             |
|            | STORM ENHANCEMENT               |                      | SPECTRA                         |                 | ...JET ENGINES                    |
|            | STORM SUPPRESSION               |                      | .MOLECULAR SPECTRA              |                 | ...#RAMJET ENGINES                |
|            | TORNADOES                       |                      | .#RAMAN SPECTRA                 |                 | .....LOW VOLUME RAMJET ENGINES    |
|            |                                 |                      | .RADIATION SPECTRA              |                 | .....PULSEJET ENGINES             |
| % RAKES    |                                 |                      | ..ELECTROMAGNETIC SPECTRA       |                 | .....SUPERSONIC COMBUSTION RAMJET |
| 0101       | 0104 1202 2304                  |                      | ..#RAMAN SPECTRA                |                 | ENGINES                           |
| SN         | (USE OF A MORE SPECIFIC TERM IS | RT                   | ABSORPTION SPECTRA              |                 | .....TURBORAMJET ENGINES          |
|            | RECOMMENDED--CONSULT THE TERMS  |                      | EMISSION SPECTRA                |                 | DUMP COMBUSTORS                   |
|            | LISTED BELOW)                   |                      | LIGHT (VISIBLE RADIATION)       |                 | HYDROGEN FUELS                    |
| RT         | PRESSURE SENSORS                |                      | LINE SPECTRA                    |                 | METEOR 1 ROCKET VEHICLE           |
|            | SLOPES                          |                      | MOLECULAR ROTATION              |                 | NAVAHO MISSILE                    |
|            |                                 |                      | NONLINEAR OPTICS                |                 | SUPERSONIC LOW ALTITUDE MISSILE   |
|            |                                 |                      | VIBRATIONAL SPECTRA             |                 | TURBOJET ENGINES                  |
| % RAM      |                                 |                      |                                 |                 |                                   |
| 1504       |                                 | RAMAN SPECTROSCOPY   |                                 | RAMJET MISSILES |                                   |
| SN         | (USE OF A MORE SPECIFIC TERM IS | 1404                 | 1413 2306 2404 3009             | 2805            | 3101                              |
|            | RECOMMENDED--CONSULT THE TERMS  | UF                   | COHERENT ANTI-STOKES RAMAN      | GS              | MISSILES                          |
|            | LISTED BELOW)                   |                      |                                 |                 | #RAMJET MISSILES                  |



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|                                    |                             |                            |
|------------------------------------|-----------------------------|----------------------------|
| ..NAVAHO MISSILE                   | WATER HAMMER                | IMPACT LOADS               |
| ..SUPERSONIC LOW ALTITUDE MISSILE  |                             | STATIC LOADS               |
| RT AIR TO AIR MISSILES             | RAMSAUER EFFECT             | STRUCTURAL DESIGN CRITERIA |
| ANTI-AIRCRAFT MISSILES             | 2309 2401 2402              | TRANSIENT LOADS            |
| SUPERSONIC COMBUSTION RAMJET       | RT % EFFECTS                | VARIABLE AMPLITUDE LOADING |
| ENGINES                            | ELECTRON SCATTERING         |                            |
| SURFACE TO AIR MISSILES            | % INTERFERENCE              | RANDOM NOISE               |
| SURFACE TO SURFACE MISSILES        | NEGATIVE RESISTANCE DEVICES | 1905 2301                  |
|                                    | RARE GASES                  | UF GAUSSIAN NOISE          |
|                                    | SCATTERING CROSS SECTIONS   | GS #RANDOM NOISE           |
|                                    |                             | .RANDOM SIGNALS            |
| RAMP FUNCTIONS                     |                             | RT BACKGROUND NOISE        |
| 1902                               | RAND PROJECT                | CHANNEL NOISE              |
| GS FUNCTIONS (MATHEMATICS)         | 3404                        | COMMUNICATION THEORY       |
| #RAMP FUNCTIONS                    | GS PROGRAMS                 | ELECTROMAGNETIC NOISE      |
| RT DYNAMIC RESPONSE                | .PROJECTS                   | % NOISE                    |
| % FREQUENCY RESPONSE               | .#RAND PROJECT              | NOISE (SOUND)              |
| % REACTION TIME                    | RT OPERATIONS RESEARCH      | NOISE GENERATORS           |
| SLOPES                             |                             | NOISE SPECTRA              |
| STEP FUNCTIONS                     |                             | PROBABILITY THEORY         |
|                                    | RANDOM ACCESS               | PSEUDONOISE                |
| % RAMPS                            | 1905                        | SIGNAL TO NOISE RATIOS     |
| 0101 0102 0202                     | RT                          | STOCHASTIC PROCESSES       |
| SN (USE OF A MORE SPECIFIC TERM IS | ALOHA SYSTEM                | WHITE NOISE                |
| RECOMMENDED--CONSULT THE TERMS     | COMPUTER STORAGE DEVICES    |                            |
| LISTED BELOW)                      | INPUT/OUTPUT ROUTINES       |                            |
| RT RAMP FUNCTIONS                  | RANDOM ACCESS MEMORY        |                            |
| RAMPS (STRUCTURES)                 | RANDOM PROCESSES            |                            |
|                                    | VSAT (NETWORK)              |                            |
|                                    |                             | RANDOM NUMBERS             |
|                                    |                             | 1902 1905                  |
|                                    |                             | RT MATHEMATICAL TABLES     |
|                                    |                             | % NUMBERS                  |
|                                    |                             | PSEUDORANDOM SEQUENCES     |
|                                    |                             |                            |
|                                    |                             | RANDOM PROCESSES           |
|                                    |                             | 1905 3407                  |
|                                    |                             | GS STOCHASTIC PROCESSES    |
|                                    |                             | #RANDOM PROCESSES          |
|                                    |                             | .RANDOM WALK               |
|                                    |                             | RT COMMUNICATION THEORY    |
|                                    |                             | INFORMATION THEORY         |
|                                    |                             | INTERMITTENCY              |
|                                    |                             | MARKOV PROCESSES           |
|                                    |                             | MONTE CARLO METHOD         |
|                                    |                             | RANDOM ACCESS              |
|                                    |                             | STATISTICAL ANALYSIS       |
|                                    |                             |                            |
|                                    |                             | RANDOM SAMPLING            |
|                                    |                             | 1902 1905                  |
|                                    |                             | GS SAMPLING                |
|                                    |                             | #RANDOM SAMPLING           |
|                                    |                             | RT QUALITY CONTROL         |
|                                    |                             |                            |
|                                    |                             | RANDOM SIGNALS             |
|                                    |                             | 0704 1905 2301             |
|                                    |                             | GS RANDOM NOISE            |
|                                    |                             | #RANDOM SIGNALS            |
|                                    |                             | RT NOISE SPECTRA           |

|                                    |  |  |  |
|------------------------------------|--|--|--|
| SIGNAL TO NOISE RATIOS             |  |  |  |
| % SIGNALS                          |  |  |  |
| STOCHASTIC PROCESSES               |  |  |  |
| RANDOM VARIABLES                   |  |  |  |
| 1902 1905                          |  |  |  |
| RT FUNCTIONS (MATHEMATICS)         |  |  |  |
| SHANNON-WIENER MEASURE             |  |  |  |
| % STATISTICS                       |  |  |  |
| % VARIABLE                         |  |  |  |
| RANDOM VIBRATION                   |  |  |  |
| 0710 1905 2309                     |  |  |  |
| GS VIBRATION                       |  |  |  |
| #RANDOM VIBRATION                  |  |  |  |
| BENDING VIBRATION                  |  |  |  |
| FLUTTER                            |  |  |  |
| FORCED VIBRATION                   |  |  |  |
| LATTICE VIBRATIONS                 |  |  |  |
| LINEAR VIBRATION                   |  |  |  |
| MISSILE VIBRATION                  |  |  |  |
| NOISE (SOUND)                      |  |  |  |
| SELF INDUCED VIBRATION             |  |  |  |
| STRUCTURAL VIBRATION               |  |  |  |
| TORSIONAL VIBRATION                |  |  |  |
| RANDOM WALK                        |  |  |  |
| 1902 1905                          |  |  |  |
| GS STOCHASTIC PROCESSES            |  |  |  |
| .RANDOM PROCESSES                  |  |  |  |
| #RANDOM WALK                       |  |  |  |
| MARKOV CHAINS                      |  |  |  |
| MONTE CARLO METHOD                 |  |  |  |
| % RANGE                            |  |  |  |
| 0201 1902 1904 2311 3006 3406      |  |  |  |
| SN (USE OF A MORE SPECIFIC TERM IS |  |  |  |
| RECOMMENDED--CONSULT THE TERMS     |  |  |  |
| LISTED BELOW)                      |  |  |  |
| RT DISTANCE                        |  |  |  |
| ORBITAL POSITION ESTIMATION        |  |  |  |
| RANGE (EXTREMES)                   |  |  |  |
| RANGES (FACILITIES)                |  |  |  |
| RANGE (EXTREMES)                   |  |  |  |
| 1902                               |  |  |  |
| UF EXTREMA                         |  |  |  |
| GUMBEL THEORY                      |  |  |  |
| GS #RANGE (EXTREMES)               |  |  |  |
| .DYNAMIC RANGE                     |  |  |  |
| .FREQUENCY RANGES                  |  |  |  |
| ..OCTAVES                          |  |  |  |
| ..RADIO RANGE                      |  |  |  |
| ..SUBAUDIBLE FREQUENCIES           |  |  |  |
| .PROPORTIONAL LIMIT                |  |  |  |
| .ROCHE LIMIT                       |  |  |  |
| CONFIDENCE LIMITS                  |  |  |  |
| CONSTRAINTS                        |  |  |  |
| DISTANCE                           |  |  |  |
| DOMAINS                            |  |  |  |
| DYNAMIC CHARACTERISTICS            |  |  |  |
| ERRORS                             |  |  |  |
| FUNCTIONS (MATHEMATICS)            |  |  |  |
| HETEROGENEITY                      |  |  |  |
| HORIZON                            |  |  |  |
| INTEGRAL EQUATIONS                 |  |  |  |
| % LIMITS                           |  |  |  |
| MAXIMA                             |  |  |  |
| MEAN                               |  |  |  |
| MINIMA                             |  |  |  |
| OPTIMIZATION                       |  |  |  |
| QUALITY CONTROL                    |  |  |  |
| % RANGE                            |  |  |  |
| SENSITIVITY                        |  |  |  |
| STANDARD DEVIATION                 |  |  |  |
| STATISTICAL TESTS                  |  |  |  |
| TOLERANCES (MECHANICS)             |  |  |  |
| TOLERANCES (PHYSIOLOGY)            |  |  |  |
| % TRAVEL                           |  |  |  |
| VARIABILITY                        |  |  |  |
| VARIANCE (STATISTICS)              |  |  |  |
| RANGE AND RANGE RATE TRACKING      |  |  |  |
| 0705 0709 1109 2102 3110           |  |  |  |
| GS DISTANCE                        |  |  |  |
| #RANGE AND RANGE RATE TRACKING     |  |  |  |
| RADAR                              |  |  |  |
| #RANGE AND RANGE RATE TRACKING     |  |  |  |
| TRACKING (POSITION)                |  |  |  |
| #RANGE AND RANGE RATE TRACKING     |  |  |  |
| GLOBAL TRACKING NETWORK            |  |  |  |
| MISSILE TRACKING                   |  |  |  |
| NORTH AMERICAN SEARCH AND RANGING  |  |  |  |
| RADAR                              |  |  |  |
| OPTICAL TRACKING                   |  |  |  |
| RADAR TRACKING                     |  |  |  |
| RADIO TRACKING                     |  |  |  |
| SATELLITE TRACKING                 |  |  |  |
| STDN (NETWORK)                     |  |  |  |
| RANGE CONTROL                      |  |  |  |
| USE TRAJECTORY CONTROL             |  |  |  |
| RANGE ERRORS                       |  |  |  |
| 0705 0709 1904 2402                |  |  |  |
| SN (EXCLUDES ERRORS IN DISTANCE    |  |  |  |
| TRAVELED--LIMITED TO ERRORS IN     |  |  |  |
| DISTANCE MEASUREMENT)              |  |  |  |
| GS ERRORS                          |  |  |  |
| #RANGE ERRORS                      |  |  |  |
| RANGE FINDERS                      |  |  |  |
| 0705 1109 1406 3501                |  |  |  |
| UF RANGE INDICATORS                |  |  |  |
| GS MEASURING INSTRUMENTS           |  |  |  |
| .DISTANCE MEASURING EQUIPMENT      |  |  |  |
| .#RANGE FINDERS                    |  |  |  |
| ...OPTICAL RANGE FINDERS           |  |  |  |
| ....LASER RANGE FINDERS            |  |  |  |
| ALTIMETERS                         |  |  |  |
| FIRE CONTROL                       |  |  |  |
| GEODIMETERS                        |  |  |  |
| LASER RANGER/TRACKER               |  |  |  |
| LUNAR RANGEFINDING                 |  |  |  |
| NAVIGATION AIDS                    |  |  |  |
| POSITION INDICATORS                |  |  |  |
| RADAR EQUIPMENT                    |  |  |  |
| RANGEFINDING                       |  |  |  |
| SOUND LOCALIZATION                 |  |  |  |
| SPACE PERCEPTION                   |  |  |  |
| STADIMETERS                        |  |  |  |
| TELLUROMETERS                      |  |  |  |
| RANGE INDICATORS                   |  |  |  |
| USE RANGE FINDERS                  |  |  |  |
| RANGE MEASUREMENT                  |  |  |  |
| USE RANGEFINDING                   |  |  |  |
| RANGE RESOURCES                    |  |  |  |
| 1306 3402                          |  |  |  |
| GS RESOURCES                       |  |  |  |
| .EARTH RESOURCES                   |  |  |  |
| .#RANGE RESOURCES                  |  |  |  |
| RANGE SAFETY                       |  |  |  |
| 1108 3110                          |  |  |  |
| GS SAFETY                          |  |  |  |
| #RANGE SAFETY                      |  |  |  |
| AEROSPACE SAFETY                   |  |  |  |
| IMPACT PREDICTION                  |  |  |  |
| MISSILE RANGES                     |  |  |  |
| TEST RANGES                        |  |  |  |
| TRAJECTORY CONTROL                 |  |  |  |
| RANGEFINDING                       |  |  |  |
| 0705 1109 1304                     |  |  |  |
| UF RANGE MEASUREMENT               |  |  |  |
| RANGING                            |  |  |  |
| GS #RANGEFINDING                   |  |  |  |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |  |  |  |
|------------------------------------|--|--|--|
| .AIRBORNE RANGE AND ORBIT          |  |  |  |
| DETERMINATION                      |  |  |  |
| .LUNAR RANGEFINDING                |  |  |  |
| .SOUND RANGING                     |  |  |  |
| RT BALLISTIC CAMERAS               |  |  |  |
| LASER RANGER/TRACKER               |  |  |  |
| MAROTS (ESA)                       |  |  |  |
| % MEASUREMENT                      |  |  |  |
| RADAR MEASUREMENT                  |  |  |  |
| RADAR TRACKING                     |  |  |  |
| RADIO TRACKING                     |  |  |  |
| RANGE FINDERS                      |  |  |  |
| TRACKING (POSITION)                |  |  |  |
| RANGELANDS                         |  |  |  |
| 1303 1305 1306 1308                |  |  |  |
| GS LAND                            |  |  |  |
| RT #RANGELANDS                     |  |  |  |
| CATTLE                             |  |  |  |
| GRASSLANDS                         |  |  |  |
| GRAZING                            |  |  |  |
| LIVESTOCK                          |  |  |  |
| RURAL AREAS                        |  |  |  |
| RURAL LAND USE                     |  |  |  |
| RANGEMASTER AIRCRAFT               |  |  |  |
| USE G-1 AIRCRAFT                   |  |  |  |
| RANGER BLOCK 3 TELEVISION SYSTEM   |  |  |  |
| 3004 3108                          |  |  |  |
| GS COMMUNICATION EQUIPMENT         |  |  |  |
| .SPACECRAFT TELEVISION             |  |  |  |
| .FRANGER BLOCK 3 TELEVISION SYSTEM |  |  |  |
| TELECOMMUNICATION                  |  |  |  |
| .SPACECRAFT TELEVISION             |  |  |  |
| .FRANGER BLOCK 3 TELEVISION SYSTEM |  |  |  |
| TELEVISION SYSTEMS                 |  |  |  |
| .SPACECRAFT TELEVISION             |  |  |  |
| .FRANGER BLOCK 3 TELEVISION SYSTEM |  |  |  |
| RT % SYSTEMS                       |  |  |  |
| RANGER LUNAR LANDING VEHICLES      |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER LUNAR LANDING VEHICLES   |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER LUNAR LANDING VEHICLES  |  |  |  |
| RT BE-3 ENGINE                     |  |  |  |
| % VEHICLES                         |  |  |  |
| RANGER LUNAR PROBES                |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER LUNAR PROBES             |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER LUNAR PROBES            |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 1 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 1 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 1 LUNAR PROBE           |  |  |  |
| RANGER 2 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 2 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 2 LUNAR PROBE           |  |  |  |
| RANGER 3 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 3 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 3 LUNAR PROBE           |  |  |  |
| RANGER 4 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 4 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 4 LUNAR PROBE           |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 5 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 5 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 5 LUNAR PROBE           |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 6 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 6 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 6 LUNAR PROBE           |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 7 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 7 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 7 LUNAR PROBE           |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 8 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 8 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 8 LUNAR PROBE           |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 9 LUNAR PROBE               |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 9 LUNAR PROBE            |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 9 LUNAR PROBE           |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 10 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 10 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 10 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 11 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 11 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 11 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 12 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 12 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 12 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 13 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 13 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 13 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 14 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 14 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 14 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 15 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 15 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 15 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 16 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 16 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 16 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 17 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 17 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 17 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 18 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 18 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 18 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 19 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 19 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 19 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 20 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 20 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 20 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 21 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
| .LUNAR PROBES                      |  |  |  |
| ..RANGER LUNAR PROBES              |  |  |  |
| ..#RANGER 21 LUNAR PROBE           |  |  |  |
| UNMANNED SPACECRAFT                |  |  |  |
| .SPACE PROBES                      |  |  |  |
| ..LUNAR PROBES                     |  |  |  |
| ...RANGER LUNAR PROBES             |  |  |  |
| ...#RANGER 21 LUNAR PROBE          |  |  |  |
| RT                                 |  |  |  |
| ATLAS AGENA B LAUNCH VEHICLE       |  |  |  |
| RANGER 22 LUNAR PROBE              |  |  |  |
| 3004 3108                          |  |  |  |
| GS LUNAR SPACECRAFT                |  |  |  |
|                                    |  |  |  |

```

..#RANGER 5 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACE PROBES
..LUNAR PROBES
...RANGER LUNAR PROBES
...#RANGER 5 LUNAR PROBE

RANGER 6 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..RANGER LUNAR PROBES
...RANGER 6 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACE PROBES
..LUNAR PROBES
...RANGER LUNAR PROBES
...#RANGER 6 LUNAR PROBE

RANGER 7 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..RANGER LUNAR PROBES
...RANGER 7 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACE PROBES
..LUNAR PROBES
...RANGER LUNAR PROBES
...#RANGER 7 LUNAR PROBE

RANGER 8 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..RANGER LUNAR PROBES
...RANGER 8 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACE PROBES
..LUNAR PROBES
...RANGER LUNAR PROBES
...#RANGER 8 LUNAR PROBE

RANGER 9 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..RANGER LUNAR PROBES
...RANGER 9 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACE PROBES
..LUNAR PROBES
...RANGER LUNAR PROBES
...#RANGER 9 LUNAR PROBE

RANGES (FACILITIES)
1108 3501
GS #RANGES (FACILITIES)
..TEST RANGES
...BALLISTIC RANGES
...MISSILE RANGES
RT RADIO BEACONS
% RANGE

RANGING
USE RANGEFINDING

RANK TESTS
1902 1905
GS STATISTICAL ANALYSIS
..STATISTICAL TESTS
...#RANK TESTS
RT % TESTS

RANKINE CYCLE
3110 3304
GS CYCLES
.THERMODYNAMIC CYCLES
..#RANKINE CYCLE
RT ASTEC SOLAR TURBOELECTRIC GENERATOR
BRAYTON CYCLE
CARNOT CYCLE
LASER PROPULSION
OTTO CYCLE
SOLAR DYNAMIC POWER SYSTEMS
SOLAR GENERATORS
THERMODYNAMICS

RANKINE-HUGONIOT RELATION
1202 3304
RT AEROTHERMODYNAMICS
% DENSITY
PRESSURE GRADIENTS
SHOCK WAVE PROPAGATION

RANKING
1905
RT ARRAYS
COMPARISON
EVALUATION
RATINGS
SELECTION
SEQUENCING
VALUE

RAOULT LAW
1203 3304 3501
RT COMPOSITION (PROPERTY)
HENRY LAW
PARTIAL PRESSURE

SOLUTIONS
VAPOR PRESSURE

RAPCON (CONTROL)
USE RADAR APPROACH CONTROL

RAPID BALLISTICS IDENTIFICATION
1406 1407 1601 2310 3501
GS IDENTIFYING
#RAPID BALLISTICS IDENTIFICATION
RT DISPLAY DEVICES
IMAGING TECHNIQUES
LASER APPLICATIONS
LASERS
MEASURING INSTRUMENTS
PHOTOGRAPHY
SCANNING
STIMULATED EMISSION
STIMULATED EMISSION DEVICES

RAPID EYE MOVEMENT STATE
0408 0503
UF DESYNCHRONIZED SLEEP
REMS
DREAMS
EYE MOVEMENTS
SLEEP

RAPID QUENCHING (METALLURGY)
1701
UF RAPID SOLIDIFICATION
RT CRYSTAL GROWTH
CRYSTAL LATTICES
CRYSTAL STRUCTURE
% METALLURGY
% QUENCHING

RAPID SOLIDIFICATION
USE RAPID QUENCHING (METALLURGY)
SOLIDIFICATION

RAPID TRANSIT SYSTEMS
0204
UF HIGH SPEED TRANSPORTATION
GS TRANSPORTATION
#RAPID TRANSIT SYSTEMS
RT AIR TRANSPORTATION
AUTOMATED GUIDEWAY TRANSIT VEHICLES
AUTOMATED TRANSIT VEHICLES
CARGO
GROUND EFFECT MACHINES
HIGHWAYS
LOGISTICS
PASSENGERS
RAIL TRANSPORTATION

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```

#RARE GASES
...ARGON
...ARGON ISOTOPES
...HELIUM
...HELIUM ISOTOPES
...LIQUID HELIUM
...LIQUID HELIUM 2
...KRYPTON
...KRYPTON ISOTOPES
...KRYPTON 85
...NEON
...LIQUID NEON
...NEON ISOTOPES
...RADON
...RADON ISOTOPES
...XENON
...XENON ISOTOPES
...XENON 129
...XENON 133
...XENON 135
GASES
#RARE GASES
...ARGON
...ARGON ISOTOPES
...HELIUM
...HELIUM ISOTOPES
...LIQUID HELIUM
...LIQUID HELIUM 2
...KRYPTON
...KRYPTON ISOTOPES
...KRYPTON 85
...NEON
...LIQUID NEON
...NEON ISOTOPES
...RADON
...RADON ISOTOPES
...XENON
...XENON ISOTOPES
...XENON 129
...XENON 133
...XENON 135
MONATOMIC GASES
NONPOLAR GASES
RAMSAUER EFFECT

RT
RAREFACTION
O602 1203 1301 2404
RT
ANTINODES
COMPRESSING
ELASTIC WAVES
EXPANSION
VACUUM

RAREFACTION WAVES
USE ELASTIC WAVES

RAREFIED GAS DYNAMICS
1203 2404 3304 3501
GS
FLUID MECHANICS
...FLUID DYNAMICS
...GAS DYNAMICS
...#RAREFIED GAS DYNAMICS
RT
ATOMIC BEAMS
BGK MODEL
CHAPMAN-ENSKOG THEORY
CONTINUUM FLOW
% DYNAMICS
FREE MOLECULAR FLOW
KNUDSEN FLOW
LOW DENSITY FLOW
LOW DENSITY WIND TUNNELS
MOLECULAR BEAMS
MOLECULAR FLOW
PLASMAS (PHYSICS)
SLIP FLOW
TRANSITION FLOW

RAREFIED GASES
O603 1203 2404 3304 3501
UF
LOW DENSITY GASES
GS
GASES
#RAREFIED GASES
...COSMIC GASES
...INTERPLANETARY GAS
...INTERSTELLAR GAS
RT
ELECTRON GAS
FREE MOLECULAR FLOW
GAS DENSITY
GAS TEMPERATURE
HIGH TEMPERATURE GASES
LOW DENSITY FLOW
LOW DENSITY RESEARCH
MOLECULAR GASES

RAREFIED PLASMAS
2502
GS
GASES
#RAREFIED PLASMAS
PARTICLES
...CHARGED PARTICLES
...ENERGETIC PARTICLES
...PLASMAS (PHYSICS)
...#RAREFIED PLASMAS
RT
CATHODE GLOW
COLD PLASMAS
COLLISIONLESS PLASMAS
ELECTRON PLASMA
NONUNIFORM PLASMAS

RASERS

RAREFIED GAS DYNAMICS
O705 0802 3407
GS
IMAGING TECHNIQUES
#RASTER SCANNING
SCANNING
#RASTER SCANNING
RT
CATHODE RAY TUBES
COMPUTER GRAPHICS
DISPLAY DEVICES
IMAGE PROCESSING
IMAGES
PICTURE TUBES
TELEVISION CAMERAS

RATE METERS
USE MEASURING INSTRUMENTS

RATE OF CLIMB INDICATORS
1402
GS
AIRCRAFT INSTRUMENTS
#RATE OF CLIMB INDICATORS
RT
ALTIMETERS
FLIGHT INSTRUMENTS
% INDICATORS

RATES (PER TIME)
1202 2311 3402 3406
GS
#RATES (PER TIME)
ACCELERATION (PHYSICS)
...ANGULAR ACCELERATION
...DECELERATION
...SPIN REDUCTION
...ELECTRON ACCELERATION
...HIGH ACCELERATION
...HIGH GRAVITY ENVIRONMENTS
...IMPACT ACCELERATION
...PARTICLE ACCELERATION
...PLASMA ACCELERATION
...TRANSVERSE ACCELERATION
...ACOUSTIC VELOCITY
...AIRSPEED
...ANGULAR VELOCITY
...BIT ERROR RATE
...BURNING RATE
...COLLISION PARAMETERS
...COLLISION RATES
...CRITICAL VELOCITY
...DECAY RATES
...ELECTRON DECAY RATE
...DRIFT RATE
...ESCAPE VELOCITY
...EVAPORATION RATE
...EXHAUST VELOCITY

```

|                             |                                     |                         |
|-----------------------------|-------------------------------------|-------------------------|
| .FLOW VELOCITY              | .SIGNAL FADING RATE                 | .ASPECT RATIO           |
| ..SOLAR WIND VELOCITY       | .SOLAR VELOCITY                     | ..HIGH ASPECT RATIO     |
| .FLUX (RATE)                | .STRAIN ENERGY RELEASE RATE         | ..LOW ASPECT RATIO      |
| ..HEAT FLUX                 | .STRAIN RATE                        | .COMPRESSION RATIO      |
| ..MAGNETIC FLUX             | .SUBSONIC SPEED                     | .DIMENSIONLESS NUMBERS  |
| ..SOLAR FLUX                | .SUPERSONIC SPEED                   | ..BIOT NUMBER           |
| .FLUX DENSITY               | .SYSTOLE                            | ..FROUDE NUMBER         |
| ..CURRENT DENSITY           | .TERMINAL VELOCITY                  | ..GRASHOF NUMBER        |
| ..PHOTON DENSITY            | .TIP SPEED                          | ..HARTMANN NUMBER       |
| ..RADIANT FLUX DENSITY      | .TRANSMISSION RATE (COMMUNICATIONS) | ..LAVAL NUMBER          |
| ..IRRADIANCE                | .TRANSONIC SPEED                    | ..LEWIS NUMBERS         |
| ..ILLUMINANCE               | .WIND VELOCITY                      | ..MACH NUMBER           |
| ..SOLAR CONSTANT            | ..SOLAR WIND VELOCITY               | ..MIXING RATIOS         |
| ..LUMENS                    | .ACCESS TIME                        | ..NUSSLET NUMBER        |
| ..LUMINOUS INTENSITY        | MTBF                                | ..PECLET NUMBER         |
| ..ILLUMINANCE               | SOLITARY WAVES                      | ..PRANDTL NUMBER        |
| ..PARTICLE FLUX DENSITY     | SOLUTE FUNCTIONS                    | ..RAYLEIGH NUMBER       |
| ..ELECTRON FLUX DENSITY     | TIME MEASUREMENT                    | ..REYNOLDS NUMBER       |
| ..NEUTRON FLUX DENSITY      | VOLUME                              | ..HIGH REYNOLDS NUMBER  |
| ..PROTON FLUX DENSITY       |                                     | ..LOW REYNOLDS NUMBER   |
| ..RADIANCE                  | RATINGS                             | ..RICHARDSON NUMBER     |
| ..RADIANCY                  | 1905 3401 3402 3404                 | ..SCHMIDT NUMBER        |
| ..SOLAR FLUX DENSITY        | RT ASSESSMENTS                      | ..SIMILARITY NUMBERS    |
| ..SOLAR CONSTANT            | CONSISTENCY                         | ..STANTON NUMBER        |
| ..SOUND INTENSITY           | EVALUATION                          | ..STROUHAL NUMBER       |
| ..ZERO SOUND                | NORMALIZING (STATISTICS)            | .FIBER VOLUME FRACTION  |
| .GROUND SPEED               | % PERFORMANCE                       | .FINENESS RATIO         |
| .GROUP VELOCITY             | POSITION (TITLE)                    | .FUEL-AIR RATIO         |
| .HEART RATE                 | RANKING                             | .INDEXES (RATIOS)       |
| ..ARRHYTHMIA                |                                     | ..KP INDEX              |
| ..BRADYCARDIA               | RATIONIERS                          | ..LEAF AREA INDEX       |
| ..TACHYCARDIA               | 1406                                | ..MORPHOLOGICAL INDEXES |
| .HIGH SPEED                 | GS MEASURING INSTRUMENTS            | ..LIFT DRAG RATIO       |
| .HYPERSONIC SPEED           | #RATIOMETERS                        | .MASS RATIOS            |
| ..ION PRODUCTION RATES      |                                     | ..MASS TO LIGHT RATIOS  |
| .LANDING SPEED              | RATIONAL FUNCTIONS                  | ..MIXING RATIOS         |
| .LIGHT SPEED                | 1902                                | ..PAYLOAD MASS RATIO    |
| .LOADING RATE               | GS ANALYSIS (MATHEMATICS)           | ..PROPELLANT MASS RATIO |
| .LOW SPEED                  | .COMPLEX VARIABLES                  | .MILLS RATIO            |
| .MASS FLOW RATE             | ..MEROMORPHIC FUNCTIONS             | .MODULAR RATIOS         |
| .ORBITAL VELOCITY           | ..#RATIONAL FUNCTIONS               | .PERVEANCE              |
| .PHASE VELOCITY             | FUNCTIONS (MATHEMATICS)             | .POISSON RATIO          |
| .PHYSIOLOGICAL ACCELERATION | .MEROMORPHIC FUNCTIONS              | .PRESSURE RATIO         |
| .PROPAGATION VELOCITY       | .#RATIONAL FUNCTIONS                | .SCALE (RATIO)          |
| .PULSE RATE                 |                                     | .SIGNAL TO NOISE RATIOS |
| ..PULSE REPETITION RATE     | RATINGS                             | .STANDING WAVE RATIOS   |
| .RADIAL VELOCITY            | O505                                | .STRESS RATIO           |
| .RECOMBINATION COEFFICIENT  | GS #RATIOS                          | .THICKNESS RATIO        |
| .RELATIVISTIC VELOCITY      | .SPACE RATIOS                       | .THRUST-WEIGHT RATIO    |
| .RESPIRATORY RATE           | RT % FOOD                           | .VOID RATIO             |
| ..DYSPNEA                   |                                     | DYNAMIC RANGE           |
| ..HYPOVENTILATION           | RATIOS                              | EFFICIENCY              |
| ..TACHYPNEA                 | 1902                                | FRACTALS                |
| .ROTOR SPEED                | UF PERCENTAGE                       | FRACTIONS               |
|                             | GS #RATIOS                          | PROPORTION              |
|                             |                                     | RT                      |

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PSYCHOLOGICAL TESTS
REFRACTIVITY
TEMPERATURE RATIO

RATS
  O402
  GS
    ANIMALS
    . VERTEBRATES
    . . MAMMALS
    . . . RODENTS
    . . . #RATS
    RT
      MICE
      POCKET MICE

RATSCAT PROGRAM
  USE RADAR TARGET SCATTER SITE PROGRAM

RAVEN HELICOPTER
  USE OH-23 HELICOPTER

RAVINES
  1306
  GS
    LANDFORMS
    #RAVINES
    CANYONS
    RT
      EROSION
      RIVER BASINS
      TOPOGRAPHY
      VALLEYS
      WATER EROSION

RAWINSONDES
  0705 1408 2001 2003
  GS
    MEASURING INSTRUMENTS
    . METEOROLOGICAL INSTRUMENTS
    . . RADIOSONDES
    . . #RAWINSONDES
    . . . SONDES
    . . . RADIOSONDES
    . . . #RAWINSONDES
    RADIO EQUIPMENT
    . RADIO TRANSMITTERS
    . . RADIOSONDES
    . . #RAWINSONDES
    TRANSMITTERS
    . RADIO TRANSMITTERS
    . . RADIOSONDES
    . . #RAWINSONDES
    DROPSONDES
    . . #RAWINSONDES
    METEOROLOGICAL BALLOONS
    RADAR TRACKING
    RADIO TRACKING
    WIND MEASUREMENT

RAY ACOUSTICS
  GRAY GAS
  LIGHT SCATTERING
  RAMAN SPECTROSCOPY
  SKY

USE GEOMETRICAL ACOUSTICS
RAY OPTICS
  USE GEOMETRICAL OPTICS

RAY TRACING
  0710 1209 2402 2901 2902 2903
  RT
    DIFFRACTION
    GEOMETRICAL OPTICS
    GEOMETRICAL THEORY OF DIFFRACTION
    GRADIENT INDEX OPTICS
    GRAZING INCIDENCE
    OPTICAL MEASUREMENT
    REFLECTANCE
    TRACKING (POSITION)
    TRANSMITTANCE

RAYLEIGH DISTRIBUTION
  1902 1905 2310
  GS
    FUNCTIONS (MATHEMATICS)
    . PROBABILITY DENSITY FUNCTIONS
    . #RAYLEIGH DISTRIBUTION
    STATISTICAL ANALYSIS
    . #RAYLEIGH DISTRIBUTION
    STATISTICAL DISTRIBUTIONS
    #RAYLEIGH DISTRIBUTION
    RT
      ERROR ANALYSIS
      OPERATIONS RESEARCH
      RADIAL DISTRIBUTION

RAYLEIGH EQUATIONS
  1902 1905 2306 2310 2402 3501
  RT %
    EQUATIONS
    FLOW EQUATIONS
    HEAT TRANSFER
    THERMODYNAMICS

RAYLEIGH NUMBER
  0710 1202 3304
  GS
    RATIOS
    . DIMENSIONLESS NUMBERS
    . #RAYLEIGH NUMBER
    RT
      BENARD CELLS
      BUOYANCY
      RAYLEIGH-BENARD CONVECTION

RAYLEIGH SCATTERING
  2306 2309 2402
  GS
    SCATTERING
    . WAVE SCATTERING
    . . ELECTROMAGNETIC SCATTERING
    . . . MIE SCATTERING
    . . . #RAYLEIGH SCATTERING
    RT
      AIRGLOW

RAYLEIGH WAVES
  0710 1202
  GS
    ELASTIC WAVES
    . SEISMIC WAVES
    . #RAYLEIGH WAVES
    RT
      BAROTROPIC FLOW
      FLUID FLOW
      S WAVES
      TWO DIMENSIONAL FLOW

RAYLEIGH-BENARD CONVECTION
  1202
  GS
    CONVECTION
    . FREE CONVECTION
    . #RAYLEIGH-BENARD CONVECTION
    . . BENARD CELLS
    FLUID FLOW
    . CONVECTIVE FLOW
    . #RAYLEIGH-BENARD CONVECTION
    . . BENARD CELLS
    CONVECTION CURRENTS
    CONVECTION-DIFFUSION EQUATION
    CONVECTIVE HEAT TRANSFER
    FORCED CONVECTION
    HOT SURFACES
    LAMINAR FLOW
    RAYLEIGH NUMBER
    SOLAR CONVECTION (ASTRONOMY)
    STELLAR CONVECTION
    THERMAL BOUNDARY LAYER

RAYLEIGH-RITZ METHOD
  1902 3501
  GS
    ANALYSIS (MATHEMATICS)
    . NUMERICAL ANALYSIS
    . . APPROXIMATION
    . . #RAYLEIGH-RITZ METHOD
    RT %
      METHODOLOGY
      VARIATIONAL PRINCIPLES

RAYON
  1808 1810 1811
  GS
    FIBERS
    . SYNTHETIC FIBERS
    . #RAYON
    TEXTILES
    #RAYON

% RAYS
  0701 1601 1902 2102 2306 2403 2502

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                   |                                            |                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| SN                                                                                                                                                                                                                                                                                                  | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                           | USE                                                                                                                                                                                                                                                                                               | RELATIVE BIOLOGICAL EFFECTIVENESS<br>(RBE) |                                                                                                                                                                                                                                                                                                                              |  |
| RT                                                                                                                                                                                                                                                                                                  | ATMOSPHERIC RADIATION<br>BACKGROUND NOISE<br>BEAMS (RADIATION)<br>CAUSTICS (OPTICS)<br>COHERENT RADIATION<br>CONTINUOUS RADIATION<br>CORPUSCULAR RADIATION<br>ELECTROMAGNETIC RADIATION<br>EXTRATERRESTRIAL RADIATION<br>GAMMA RAYS<br>LUNAR RAYS<br>POLARIZED RADIATION<br>PULSED RADIATION | RC CIRCUITS<br>0902 1001 1002<br>UF RC NETWORKS<br>GS CIRCUITS<br>#RC CIRCUITS<br>RT CAPACITANCE<br>COUPLING CIRCUITS<br>DISCRIMINATORS<br>ELECTRIC FILTERS<br>ELECTRICAL RESISTANCE<br>LC CIRCUITS<br>NETWORK ANALYSIS<br>NETWORK SYNTHESIS<br>RLC CIRCUITS<br>TIME CONSTANT<br>TRANSCONDUCTANCE |                                            | RCB STARS<br>USE R CORONAE BOREALIS STARS                                                                                                                                                                                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                     | RAYTHEON COMPUTERS<br>0802 0803<br>GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>..DIGITAL COMPUTERS<br>..RAYTHEON COMPUTERS                                                                                                                                                                 | RC NETWORKS<br>USE RC CIRCUITS                                                                                                                                                                                                                                                                    |                                            | RDX<br>1808 3302<br>UF CYCLOTRIMETHYLENE TRINITRAMINE<br>GS TRINITROTETRAZOCYCLOHEXANE<br>EXPLOSIVES<br>#RDX<br>NITROGEN COMPOUNDS<br>.AZO COMPOUNDS<br>ORGANIC COMPOUNDS<br>.CYCLIC COMPOUNDS<br>..HETEROCYCLIC COMPOUNDS<br>..#RDX<br>PROPELLANTS<br>#RDX<br>PYROTECHNICS<br>SOLID PROPELLANTS<br>SOLID ROCKET PROPELLANTS |  |
| RAZOR BLADES<br>1504<br>GS CUTTERS<br>.BLADES (CUTTERS)<br>..#RAZOR BLADES                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                              | RCA COMPUTERS<br>0801 0802 0905<br>GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>..RCA COMPUTERS<br>...RCA SPECTRA 70 COMPUTER<br>...RCA-110 COMPUTERS<br>RT DATA PROCESSING                                                                                                                      |                                            | REACTANCE<br>0902 1001 1002<br>GS ELECTRICAL PROPERTIES<br>ELECTRICAL IMPEDANCE<br>#REACTANCE<br>IMPEDANCE<br>ELECTRICAL IMPEDANCE<br>#REACTANCE<br>CAPACITANCE<br>ELECTRICAL RESISTANCE<br>FOSTER THEORY<br>INDUCTANCE<br>SMITH CHART<br>TRANSCONDUCTANCE                                                                   |  |
| RB-47 AIRCRAFT<br>USE B-47 AIRCRAFT                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                              | RCA SATCOM SATELLITES<br>3107 0706 3107<br>GS ARTIFICIAL SATELLITES<br>.COMMUNICATION SATELLITES<br>#RCA SATCOM SATELLITES<br>COMMERCIAL SPACECRAFT<br>#RCA SATCOM SATELLITES<br>DELTA LAUNCH VEHICLE<br>RT DOMESTIC SATELLITE COMMUNICATIONS<br>SYSTEMS                                          |                                            | REACTANCE AMPLIFIERS<br>USE PARAMETRIC AMPLIFIERS                                                                                                                                                                                                                                                                            |  |
| RB-50 AIRCRAFT<br>0207 3401<br>UF SUPER FORTRESS AIRCRAFT<br>GS BOEING AIRCRAFT<br>#RB-50 AIRCRAFT<br>MONOPLANES<br>#RB-50 AIRCRAFT<br>OBSERVATION AIRCRAFT<br>#RB-50 AIRCRAFT<br>RECONNAISSANCE AIRCRAFT<br>#RB-50 AIRCRAFT<br>RT % AIRCRAFT<br>BOMBER AIRCRAFT<br>WEATHER RECONNAISSANCE AIRCRAFT |                                                                                                                                                                                                                                                                                              | RCA SPECTRA 70 COMPUTER<br>0801<br>GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>..DIGITAL COMPUTERS<br>...RCA SPECTRA 70 COMPUTER<br>...RCA COMPUTERS<br>...RCA SPECTRA 70 COMPUTER                                                                                                              |                                            | REACTING FLOW<br>0602 1202 3301<br>UF CHEMICALLY REACTING FLOW<br>GS FLUID FLOW<br>#REACTING FLOW<br>..COMBUSTIBLE FLOW<br>RT BOUNDARY LAYER COMBUSTION<br>CHEMICAL REACTIONS<br>COMBUSTION CHEMISTRY<br>DETONABLE GAS MIXTURES<br>FLAME PROPAGATION                                                                         |  |
| RB-57 AIRCRAFT<br>USE B-57 AIRCRAFT                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                   |                                            |                                                                                                                                                                                                                                                                                                                              |  |
| RB-66 AIRCRAFT<br>USE B-66 AIRCRAFT                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                              | RCA-110 COMPUTERS<br>1801<br>GS DATA PROCESSING EQUIPMENT                                                                                                                                                                                                                                         |                                            |                                                                                                                                                                                                                                                                                                                              |  |
| RBE                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                   |                                            |                                                                                                                                                                                                                                                                                                                              |  |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

BLANKETS (FISSION REACTORS)  
 BLANKETS (FUSION REACTORS)  
 CHEMICAL REACTORS  
 COMPUTER AIDED DESIGN  
 % DESIGN  
 ENGINE DESIGN  
 ENGINEERING TEST REACTORS  
 HANFORD REACTORS  
 HIGH TEMPERATURE NUCLEAR REACTORS  
 LIMITERS (FUSION REACTORS)  
 NUCLEAR REACTORS  
 NUCLEAR RESEARCH AND TEST REACTORS  
 OFFSHORE REACTOR SITES  
 ORGANIC COOLED REACTORS  
 PEBBLE BED REACTORS  
 PRODUCT DEVELOPMENT

REACTOR SAFETY  
 2202 2203 2204 3404  
 GS SAFETY  
 #REACTOR SAFETY  
 RT ANNUAL CORE PULSE REACTORS  
 CHEMICAL REACTORS  
 CONTROL RODS  
 EXPLOSIONS  
 INDUSTRIAL SAFETY  
 NUCLEAR REACTOR CONTROL  
 NUCLEAR REACTORS  
 OFFSHORE REACTOR SITES  
 RADIATION HAZARDS  
 % REACTION CONTROL  
 RELIEF VALVES  
 TRANSIENT REACTOR TEST FACILITY

FUSION-FISSION HYBRID REACTORS  
 HIGH TEMPERATURE NUCLEAR REACTORS  
 MOLTEN SALT NUCLEAR REACTORS  
 NUCLEAR REACTORS  
 NUCLEAR RESEARCH AND TEST REACTORS  
 PLASMA CORE REACTORS  
 POWER REACTORS  
 RIFT (REACTOR IN FLIGHT TEST)  
 SNAPTRAN REACTOR  
 SPHEROMAKS  
 SWIMMING POOL REACTORS  
 THERMAL REACTORS  
 TOKAMAK DEVICES  
 WATER COOLED REACTORS

## READ-ONLY MEMORY DEVICES

REACTOR FUELS  
 USE NUCLEAR FUELS

0801 ROM DEVICES  
 UF COMPUTER STORAGE DEVICES  
 GS #READ-ONLY MEMORY DEVICES  
 . . CD-ROM  
 RT COMPUTER COMPONENTS  
 COMPUTER DESIGN  
 COMPUTER SYSTEMS DESIGN  
 COMPUTERS

REACTOR IN FLIGHT TEST PROGRAM  
 USE RIFT (REACTOR IN FLIGHT TEST)

REACTOR MATERIALS  
 2203 2204 2405  
 RT ANNUAL CORE PULSE REACTORS  
 BLANKETS (FISSION REACTORS)  
 BLANKETS (FUSION REACTORS)  
 CHEMICAL REACTORS  
 % CONSTRUCTION MATERIALS

REACTOR STARTUP TESTS  
 2202 2203 2204 2205  
 GS FUEL TESTS  
 #REACTOR STARTUP TESTS  
 RT INITIATION  
 NUCLEAR FUELS  
 NUCLEAR REACTORS  
 STARTING  
 % TESTS

READ-ONLY MEMORY DEVICES  
 0801 ROM DEVICES  
 UF COMPUTER STORAGE DEVICES  
 GS #READ-ONLY MEMORY DEVICES  
 . . CD-ROM  
 RT COMPUTER COMPONENTS  
 COMPUTER DESIGN  
 COMPUTER SYSTEMS DESIGN  
 COMPUTERS

% COOLANTS  
 LIMITERS (FUSION REACTORS)  
 LOSS OF COOLANT  
 % MATERIALS  
 MODERATORS  
 NUCLEAR FUEL ELEMENTS  
 NUCLEAR FUELS  
 NUCLEAR REACTORS  
 PRESSURE VESSELS  
 RADIATION SHIELDING  
 SPENT FUELS

REACTOR TECHNOLOGY  
 2202 2203 2204 3404  
 GS TECHNOLOGIES  
 #REACTOR TECHNOLOGY  
 RT ANNUAL CORE PULSE REACTORS  
 % ENGINEERING  
 ENGINEERING TEST REACTORS  
 HANFORD REACTORS  
 HIGH TEMPERATURE NUCLEAR REACTORS  
 JOINT EUROPEAN TORUS  
 NUCLEAR FUEL BURNUP  
 NUCLEAR REACTORS  
 NUCLEAR RESEARCH AND TEST REACTORS  
 OFFSHORE REACTOR SITES  
 ORGANIC COOLED REACTORS  
 PEBBLE BED REACTORS  
 REVERSE FIELD PINCH

## READERS

0803 READING MACHINES  
 UF CHARACTER RECOGNITION  
 RT CONICAL SCANNING  
 % DETECTORS  
 MAGNETIC TAPES  
 MICROFILMS  
 OPTICAL DATA PROCESSING  
 OPTICAL SCANNERS  
 PATTERN RECOGNITION  
 PUNCHED CARDS  
 PUNCHED TAPES  
 READING

REACTOR PHYSICS  
 2202 2203 2204 2405  
 GS NUCLEAR PHYSICS  
 #REACTOR PHYSICS  
 RT ANNUAL CORE PULSE REACTORS  
 BETA FACTOR  
 HANFORD REACTORS  
 INHOUR EQUATION  
 NUCLEAR FUEL BURNUP  
 NUCLEAR REACTORS  
 % PHYSICS  
 % SCIENCE

READING  
 0803  
 GS #READING  
 .LIP READING  
 RT CHARACTER RECOGNITION  
 CONICAL SCANNING  
 DATA TRANSMISSION  
 DISPLAY DEVICES  
 INPUT  
 % INTERPRETATION  
 LEGIBILITY  
 PERCEPTION  
 PRINTING  
 READERS

% REACTORS  
 0504 0904 0905 2203 2204  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ANNUAL CORE PULSE REACTORS  
 CHEMICAL REACTORS  
 ELECTRIC REACTORS  
 FAST TEST REACTORS  
 FUSION REACTORS

SCANNERS  
SCANNING  
SYMBOLS  
VISIBILITY

READING MACHINES  
USE READERS

READJUSTMENT  
USE ADJUSTING

READOUT  
O802 0803 3405  
RT DISPLAY DEVICES  
MULTIPLE OUTPUT PROGRAMS  
OUTPUT  
PRINTERS (DATA PROCESSING)  
PRINTOUTS  
REMOTE CONSOLES

REAGENTS  
O603  
RT CATALYSTS  
CHEMICAL ANALYSIS  
CHEMICAL REACTIONS  
REACTION KINETICS

REAL GASES  
O603 1203 2405 3501  
GS GASES  
#REAL GASES  
RT EQUATIONS OF STATE  
GAS DENSITY  
IDEAL GAS  
KINETIC THEORY  
MOLECULAR GASES  
MONATOMIC GASES

REAL NUMBERS  
1902  
GS #REAL NUMBERS  
. INTEGERS  
RT COMPLEX NUMBERS  
% NUMBERS

REAL TIME OPERATION  
O707 0708 0802 3107  
RT AUTOMATIC CONTROL  
COMPUTER PROGRAMMING  
COMPUTERS  
DISPLAY DEVICES  
INTEGRATED MISSION CONTROL CENTER  
MULTIPROCESSING (COMPUTERS)  
ONBOARD DATA PROCESSING  
WINDOWS (COMPUTER PROGRAMS)

REAL VARIABLES

1902 1903  
GS ANALYSIS (MATHEMATICS)  
#REAL VARIABLES  
..ABEL FUNCTION  
..ASYMPTOTES  
..BESSEL FUNCTIONS  
..HANKEL FUNCTIONS  
..BETHE-SALPETER EQUATION  
..CALCULUS OF VARIATIONS  
..COMPOSITE FUNCTIONS  
..DELTA FUNCTION  
..DIFFERENTIAL EQUATIONS  
..BLASIUS EQUATION  
..CHANDRASEKHAR EQUATION  
..COSINE SERIES  
..DUFFING DIFFERENTIAL EQUATION  
..FALKNER-SKAN EQUATION  
..HYPERBOLIC DIFFERENTIAL EQUATIONS  
..LAME WAVE EQUATIONS  
..PARTIAL DIFFERENTIAL EQUATIONS  
..BIHARMONIC EQUATIONS  
..BURGER EQUATION  
..CAUCHY-RIEMANN EQUATIONS  
..ELLIPTIC DIFFERENTIAL EQUATIONS  
..MONGE-AMPERE EQUATION  
..EULER-CAUCHY EQUATIONS  
..FOKKER-PLANCK EQUATION  
..GAUSS EQUATION  
..HELMHOLTZ VORTICITY EQUATION  
..LIOUVILLE EQUATIONS  
..PARABOLIC DIFFERENTIAL EQUATIONS  
..POISSON EQUATION  
..VLASOV EQUATIONS  
..RICCATI EQUATION  
..VORTICITY EQUATIONS  
..HELMHOLTZ VORTICITY EQUATION  
..EINSTEIN EQUATIONS  
..EXISTENCE THEOREMS  
..EXTREMUM VALUES  
..LIMITS (MATHEMATICS)  
..MAXIMA  
..MINIMA  
..FOURIER-BESSEL TRANSFORMATIONS  
..GREEN'S FUNCTIONS  
..HYPERBOLIC FUNCTIONS  
..HYPERPLANES  
..JACOBI INTEGRAL  
..JACOBI MATRIX METHOD  
..KERNEL FUNCTIONS  
..LIAPUNOV FUNCTIONS  
..LINEAR EQUATIONS

RT

...LINEAR EVOLUTION EQUATIONS  
...RICCATI EQUATION  
...LIPSCHITZ CONDITION  
...MEASURE AND INTEGRATION  
...BINARY INTEGRATION  
...BOREL SETS  
...FUNCTIONAL INTEGRATION  
...INTEGRAL CALCULUS  
...J INTEGRAL  
...LEBESGUE THEOREM  
...NUMERICAL INTEGRATION  
...RUNGE-KUTTA METHOD  
...STIELTJES INTEGRAL  
...WEIGHTING FUNCTIONS  
...NEUMANN PROBLEM  
...NONLINEAR EQUATIONS  
...CUBIC EQUATIONS  
...DUFFING DIFFERENTIAL EQUATION  
...MONGE-AMPERE EQUATION  
...NONLINEAR EVOLUTION EQUATIONS  
...QUADRATIC EQUATIONS  
...QUARTIC EQUATIONS  
...NUMERICAL DIFFERENTIATION  
...PERIODIC FUNCTIONS  
...TRIGONOMETRIC FUNCTIONS  
...COSINE SERIES  
...SINE SERIES  
...TANGENTS  
...SERIES (MATHEMATICS)  
...ASYMPTOTIC SERIES  
...CAMPBELL-HAUSDORFF SERIES  
...COSINE SERIES  
...FOURIER SERIES  
...PADE APPROXIMATION  
...POWER SERIES  
...TAYLOR SERIES  
...MACLAURIN SERIES  
...PROGRESSIONS  
...PRONY SERIES  
...SINE SERIES  
...STURM-LIOUVILLE THEORY  
...VECTOR ANALYSIS  
...COLLINEARITY  
...COPLANARITY  
...CURL (VECTORS)  
...VORTICITY  
...WEIERSTRASS FUNCTIONS  
...WHITTAKER FUNCTIONS  
APERIODIC FUNCTIONS  
CALCULUS  
CHOLESKY FACTORIZATION  
COMPLEX VARIABLES  
CONTINUUMS  
DEPENDENT VARIABLES  
DIFFERENTIAL CALCULUS

# NASA THESAURUS HIERARCHICAL UPDATE

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FACTORIZATION
FOURIER ANALYSIS
HERMITIAN POLYNOMIAL
HYPERSPHERES
INFINITY
INFLECTION POINTS
MAXIMUM PRINCIPLE
MONOTONE FUNCTIONS
SCHMIDT METHOD
STABILITY DERIVATIVES
UNIQUENESS THEOREM
% VARIABLE

REARWARD FACING STEPS
USE BACKWARD FACING STEPS

REATTACHED FLOW
O401 1201 1202 1203 3105
GS FLUID FLOW
.VISCIOUS FLOW
..BOUNDARY LAYER FLOW
..#REATTACHED FLOW
RT % ATTACHMENT
BACKWARD FACING STEPS
BOUNDARY LAYER SEPARATION
COANDA EFFECT
CROCCO-LEE THEORY
FLOW CHARACTERISTICS
FLOW DISTRIBUTION
SEPARATED FLOW

REATTACHMENT
USE ATTACHMENT

REB
USE RELATIVISTIC ELECTRON BEAMS

REBREATHING
O401 0505 0507
RT AIR PURIFICATION
CARBON DIOXIDE CONCENTRATION
CARBON DIOXIDE REMOVAL
EXPIRED AIR
LIFE SUPPORT SYSTEMS
SPACECRAFT CABIN ATMOSPHERES

RECEIVERS
O701 0703 1409 1413
UF RECEIVING SYSTEMS
GS #RECEIVERS
.LINEAR RECEIVERS
.LOGARITHMIC RECEIVERS
.RADAR RECEIVERS
.RADIO RECEIVERS
..SUPERHETERODYNE RECEIVERS

..TRANSMITTER RECEIVERS
..WHISTLER RECORDERS
.RADIOTELEPHONES
.TELEVISION RECEIVERS
RT AMPLIFIERS
% DETECTORS
DISPLAY DEVICES
DUPLEXERS
ELECTRIC FILTERS
INSTRUMENT RECEIVERS
% RECEIVING
REPEATERS
TANKS (CONTAINERS)
TELEPRINTERS
TELETYPEWRITERS
TRANSMITTERS

% RECEIVING
O705 0708 1409
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
UF RECEPTION
RT ACQUISITION
COLLECTION
DELIVERY
PROCUREMENT
RADAR RECEPTION
RADIO RECEPTION
RECEIVERS
RECOGNITION
SIGNAL RECEPTION
TELEVISION RECEPTION

RECEIVING SYSTEMS
USE RECEIVERS

RECEPTACLES (CONTAINERS)
USE CONTAINERS

RECEPTION
USE RECEIVING

RECEPTION DIVERSITY
O702 0703 0705 0802
UF SPACE DIVERSITY
GS RADIO EQUIPMENT
#RECEPTION DIVERSITY
RT FADING
RADIO ANTENNAS
RADIO RECEIVERS
RADIO RECEPTION
SIGNAL FADING

RECEPTORS (PHYSIOLOGY)

O401 0405 0408
GS #RECEPTORS (PHYSIOLOGY)
.BARORECEPTORS
.CHEMORECEPTORS
.GRAVIRECEPTORS
..OTOLITH ORGANS
.MECHANORECEPTORS
.PHOTORECEPTORS
.PROPRIOCEPTORS
.THERMORECEPTORS
RT SENSE ORGANS
SENSITOMETRY

RECESSES
O404 1308 1704 3406
RT CAVITIES
CREVASSES
% HOLLOW

RECESSION
3402
RT % DEPRESSION
ECONOMICS

RECHARGING
2307
RT CHARGE EFFICIENCY

RECIPROCAL THEOREMS
1413 1902 2301 2402
GS THEOREMS
#RECIPROCAL THEOREMS
RT ANGLES (GEOMETRY)
GEOMETRY
LINES (GEOMETRY)
POINTS (MATHEMATICS)
PROJECTIVE GEOMETRY

RECIPROCATING ENGINES
USE PISTON ENGINES

RECIPROCATION
1504 3404 3406 3407
RT CYCLES
MECHANICAL OSCILLATORS
PISTON ENGINES
PISTONS

RECIPROCITY THEOREM
O901
GS THEOREMS
#RECIPROCITY THEOREM
RT ACOUSTIC SCATTERING
ELECTROMAGNETIC FIELDS
ELECTROMAGNETIC SCATTERING

```

WAVE SCATTERING  
RECIRCULATION  
USE CIRCULATION  
RECIRCULATIVE FLUID FLOW  
O303 1202 1204 2805  
GS FLUID FLOW  
#RECIRCULATIVE FLUID FLOW  
RT BACKWARD FACING STEPS  
BOUNDARY LAYER FLOW  
BOUNDARY LAYER SEPARATION  
REVERSED FLOW  
TURBULENT FLOW  
TURBULENT MIXING  
VORTICES  
RECLAMATION  
O505  
GS #RECLAMATION  
.GAS RECOVERY  
.MATERIALS RECOVERY  
.NUCLEAR FUEL REPROCESSING  
.SOLVOLYSIS  
.WATER RECLAMATION  
RT OIL RECOVERY  
% RECOVERY  
RECYCLING  
REGENERATION (ENGINEERING)  
RECOGNITION  
O408 0410 3407  
GS #RECOGNITION  
.PATTERN RECOGNITION  
.CHARACTER RECOGNITION  
.GRAPHOLOGY  
.SPEECH RECOGNITION  
.TARGET RECOGNITION  
.TIMBER IDENTIFICATION  
RT ACQUISITION  
CONSCIOUSNESS  
CROP IDENTIFICATION  
IDENTIFYING  
IFF SYSTEMS (IDENTIFICATION)  
% INTERPRETATION  
MEMORY  
% RECEIVING  
REMOTE SENSING  
RECOIL ATOMS  
2401 2405  
GS ATOMS  
#RECOIL ATOMS  
RT RECOILINGS  
RECOIL IONS  
1804 2401 2402  
GS IONS  
#RECOIL IONS  
RT ATOMIC COLLISIONS  
CHARGE EXCHANGE  
ELECTRON SCATTERING  
ION IMPACT  
ION PRODUCTION RATES  
ION SCATTERING  
IONIC COLLISIONS  
RECOILINGS  
RECOIL PROTONS  
2401 2403  
GS PARTICLES  
.CHARGED PARTICLES  
.PROTONS  
.RECOIL PROTONS  
.ELEMENTARY PARTICLES  
.FERMIONS  
.PROTONS  
.RECOIL PROTONS  
RT BARYONS  
RECOILINGS  
RECOILINGS  
2401 2405  
RT COLLISIONS  
PARTICLE MOTION  
RECOIL ATOMS  
RECOIL IONS  
RECOIL PROTONS  
RECOMBINATION COEFFICIENT  
O603 1203 2404  
GS COEFFICIENTS  
#RECOMBINATION COEFFICIENT  
RATES (PER TIME)  
#RECOMBINATION COEFFICIENT  
RT FREE ELECTRONS  
ION RECOMBINATION  
IONIZED GASES  
RECOMBINATION REACTIONS  
O603 0604 2401 2404 3407  
GS #RECOMBINATION REACTIONS  
.ATOMIC RECOMBINATION  
.OXYGEN RECOMBINATION  
.ELECTRON RECOMBINATION  
.RADIATIVE RECOMBINATION  
.ELECTRON-ION RECOMBINATION  
.RADIATIVE RECOMBINATION  
.HYDROGEN RECOMBINATION  
.ION RECOMBINATION  
RECOIL COLLISIONS  
CAPTURE EFFECT  
FERTILIZATION  
SUHL EFFECT  
RECOMMENDATIONS  
O703 0802 1905  
GS #RECOMMENDATIONS  
.SUGGESTION  
RT DECISION THEORY  
GENERAL OVERVIEWS  
RECOMPRESSION  
USE COMPRESSING  
RECONNAISSANCE  
1401 1407 3401 3501  
GS #RECONNAISSANCE  
.AERIAL RECONNAISSANCE  
.AIRBORNE INTEGRATED  
RECONNAISSANCE SYSTEM  
.PHOTORECONNAISSANCE  
.SPECTRAL RECONNAISSANCE  
RT COSPAS  
EARTH RESOURCES  
OBSERVATION  
PATROLS  
PHOTO GEOLOGY  
SARSAT  
SEARCHING  
SPACE OBSERVATIONS (FROM EARTH)  
SPACE SURVEILLANCE (SPACEBORNE)  
SURVEILLANCE  
SURVEYS  
TERRAIN ANALYSIS  
RECONNAISSANCE AIRCRAFT  
O207 1401 1402 3401 3501  
GS #RECONNAISSANCE AIRCRAFT  
.A-9 AIRCRAFT  
.BREGUET 1150 AIRCRAFT  
.CESSNA L-19 AIRCRAFT  
.CL-84 AIRCRAFT  
.EARTH RESOURCES SURVEY AIRCRAFT  
.F-5 AIRCRAFT  
.G-91 AIRCRAFT  
.G-95/4 AIRCRAFT  
.HS-801 AIRCRAFT  
.MIRAGE AIRCRAFT  
.MIRAGE 3 AIRCRAFT  
.OV-10 AIRCRAFT  
.P-1127 AIRCRAFT  
.P-1154 AIRCRAFT  
.RB-50 AIRCRAFT  
.SR-71 AIRCRAFT

# NASA THESAURUS HIERARCHICAL UPDATE

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>.TSR-2 AIRCRAFT</li> <li>.U-2 AIRCRAFT</li> <li>.VICTOR MK-1 AIRCRAFT</li> <li>.WEATHER RECONNAISSANCE AIRCRAFT</li> <li>AERIAL RECONNAISSANCE</li> <li>RT % AIRCRAFT</li> <li>ANTISUBMARINE WARFARE AIRCRAFT</li> <li>FLYING PLATFORMS</li> <li>JET AIRCRAFT</li> <li>LIGHT AIRCRAFT</li> <li>% MILITARY AIRCRAFT</li> <li>% MILITARY AVIATION</li> <li>MILITARY HELICOPTERS</li> <li>OBSERVATION AIRCRAFT</li> <li>PILOTLESS AIRCRAFT</li> <li>SUBMERSIBLE AIRCRAFT</li> <li>SUPERSONIC AIRCRAFT</li> <li>UTILITY AIRCRAFT</li> <li>V/STOL AIRCRAFT</li> <li>VALIANT AIRCRAFT</li> <li>WATER TAKEOFF AND LANDING AIRCRAFT</li> <li>YF-12 AIRCRAFT</li> </ul> | <ul style="list-style-type: none"> <li>RT CABLE FORCE RECORDERS</li> <li>DATA RECORDERS</li> <li>PLAYBACKS</li> <li>RECORDING INSTRUMENTS</li> <li>REGISTERS (COMPUTERS)</li> <li>TAPE RECORDERS</li> <li>VLF EMISSION RECORDERS</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>AUTOMATIC CONTROL</li> <li>BUBBLE TECHNIQUE</li> <li>CONTROL EQUIPMENT</li> <li>COUNTERS</li> <li>DATA RECORDERS</li> <li>ELECTRONIC RECORDING SYSTEMS</li> <li>FLIGHT INSTRUMENTS</li> <li>GRAPHS (CHARTS)</li> <li>INDICATING INSTRUMENTS</li> <li>INSTRUMENT RECEIVERS</li> <li>INSTRUMENT TRANSMITTERS</li> <li>% INSTRUMENTS</li> <li>MEASURING INSTRUMENTS</li> <li>METEOROLOGICAL INSTRUMENTS</li> <li>% PENS</li> <li>PHOTOGRAPHIC RECORDING</li> <li>% RECORDERS</li> <li>RECORDING HEADS</li> <li>SONOGRAMS</li> <li>TAPE RECORDERS</li> <li>TRANSDUCERS</li> <li>VLF EMISSION RECORDERS</li> </ul>                                                                                                              |
| <ul style="list-style-type: none"> <li>RECONNAISSANCE SPACECRAFT</li> <li>1401 3107 3108 3401</li> <li>GS MILITARY SPACECRAFT</li> <li>#RECONNAISSANCE SPACECRAFT</li> <li>..INSPECTOR SATELLITE</li> <li>..MIDAS SATELLITES</li> <li>...MIDAS 2 SATELLITE</li> <li>...MIDAS 3 SATELLITE</li> <li>...MIDAS 4 SATELLITE</li> <li>...MIDAS 5 SATELLITE</li> <li>...MIDAS 6 SATELLITE</li> <li>...MIDAS 7 SATELLITE</li> <li>..PHOTO RECONNAISSANCE SPACECRAFT</li> <li>..SAMOS</li> <li>RT AERIAL RECONNAISSANCE</li> <li>ARTIFICIAL SATELLITES</li> <li>MANNED ORBITAL LABORATORIES</li> <li>MANNED SPACECRAFT</li> <li>UNMANNED SPACECRAFT</li> </ul>                                                 | <ul style="list-style-type: none"> <li>RECORDING</li> <li>3403 3405 3406 3407</li> <li>GS #RECORDING</li> <li>.DATA SMOOTHING</li> <li>.MAGNETIC RECORDING</li> <li>.PHOTOGRAPHIC RECORDING</li> <li>.PREDICTION RECORDING</li> <li>PLAYBACKS</li> <li>PLOTTING</li> <li>PRIVACY</li> <li>% STORAGE</li> <li>RT RECORDING HEADS</li> <li>0803</li> <li>RT DATA RECORDING</li> <li>MAGNETIC RECORDING</li> <li>MAGNETIC TAPES</li> <li>RECORDING INSTRUMENTS</li> <li>TAPE RECORDERS</li> <li>VIDEO EQUIPMENT</li> </ul>                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>RECORDS</li> <li>0904 0905 1105 1106 3403 3405 3406</li> <li>GS DOCUMENTS</li> <li>#RECORDS</li> <li>..VIDEO DISKS</li> <li>CASE HISTORIES</li> <li>% DATA</li> <li>DATA PROCESSING</li> <li>DATA RECORDING</li> <li>DOCUMENTATION</li> <li>% DRAWING</li> <li>FORMAT</li> <li>HISTORIES</li> <li>PERIODICALS</li> <li>PLAYBACKS</li> <li>PRESIDENTIAL REPORTS</li> <li>PRIVACY</li> <li>RECORDS MANAGEMENT</li> <li>REPORTS</li> <li>SUPPLEMENTS</li> <li>TECHNICAL WRITING</li> <li>% TESTS</li> <li>TEXTS</li> <li>RECORDS MANAGEMENT</li> <li>3405 3406 4001</li> <li>GS MANAGEMENT</li> <li>.INFORMATION MANAGEMENT</li> <li>.#RECORDS MANAGEMENT</li> <li>RT DATA MANAGEMENT</li> <li>INFORMATION SYSTEMS</li> </ul> |
| <ul style="list-style-type: none"> <li>RECONSTRUCTION</li> <li>3406 3407</li> <li>GS #RECONSTRUCTION</li> <li>.WAVE FRONT RECONSTRUCTION</li> <li>RT CONSTRUCTION</li> <li>RESTORATION</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>RECORDING INSTRUMENTS</li> <li>0501 0904 0905 1308 1403 1406 3405</li> <li>3501</li> <li>UF EMISSOGRAPHS</li> <li>PLUVIOGRAPHS</li> <li>THERMOGRAMS</li> <li>GS #RECORDING INSTRUMENTS</li> <li>.BATHYTHERMGRAPHS</li> <li>.CABLE FORCE RECORDERS</li> <li>.FLIGHT LOAD RECORDERS</li> <li>.FLIGHT RECORDERS</li> <li>.FORCE VECTOR RECORDERS</li> <li>.MECHANOGAMS</li> <li>.OSCILLOGRAPHS</li> <li>.PLOTTERS</li> <li>..X-Y PLOTTERS</li> <li>.PRESSURE RECORDERS</li> <li>.RADIONETEOROGAPHS</li> <li>.SEISMOGRAPHS</li> <li>..LUNAR SEISMOGRAPHS</li> <li>.TAPE RECORDERS</li> <li>..VIDEO TAPE RECORDERS</li> <li>.WEATHER DATA RECORDERS</li> <li>.WHISTLER RECORDERS</li> <li>RT AIRCRAFT INSTRUMENTS</li> </ul> | <ul style="list-style-type: none"> <li>RECONSTRUCTION</li> <li>3406 3407</li> <li>GS #RECONSTRUCTION</li> <li>.WAVE FRONT RECONSTRUCTION</li> <li>RT CONSTRUCTION</li> <li>RESTORATION</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>% RECORDERS</li> <li>0202 0701 0802 1401 1402 2002 3501</li> <li>SN (USE OF A MORE SPECIFIC TERM IS</li> <li>RECOMMENDED--CONSULT THE TERMS</li> <li>LISTED BELOW)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

MANAGEMENT INFORMATION SYSTEMS  
RECORDS

## RECOVERABILITY

3408

RT DAMAGE ASSESSMENT

% PROPERTIES

% RECOVERY

## RECOVERABLE LAUNCH VEHICLES

1102 3102 3103 3110

GS LAUNCH VEHICLES

RT #RECOVERABLE LAUNCH VEHICLES

RT BOOSTER RECOVERY

LAUNCH VEHICLE CONFIGURATIONS

MULTIENGINE VEHICLES

% RECOVERY

RECOVERY PARACHUTES

REUSABLE LAUNCH VEHICLES

% VEHICLES

% WINGED VEHICLES

## RECOVERABLE SATELLITES

USE RECOVERABLE SPACECRAFT

## RECOVERABLE SPACECRAFT

1102 3104 3107 3110

UF RECOVERABLE SATELLITES

GS REENTRY VEHICLES

#RECOVERABLE SPACECRAFT

...APOLLO SPACECRAFT

...APOLLO LUNAR EXPERIMENT MODULE

...ASTRO VEHICLE

...GEMINI B SPACECRAFT

...GEMINI SPACECRAFT

...GEMINI (GT-1) SPACECRAFT

...GEMINI 2 SPACECRAFT

...MERCURY SPACECRAFT

...AURORA 7

...FAITH 7

...FRIENDSHIP 7

...SIGMA 7

...REUSABLE SPACECRAFT

...AEROSPACE PLANES

...HOTOL LAUNCH VEHICLE

...X-30 VEHICLE

...MARS (MANNED REUSABLE

SPACECRAFT)

...SPACE SHUTTLE ORBITERS

...ATLANTIS (ORBITER)

...CHALLENGER (ORBITER)

...COLUMBIA (ORBITER)

...DISCOVERY (ORBITER)

...ENDEAVOUR (ORBITER)

...ENTERPRISE (ORBITER)

...SPACE SHUTTLES

...BURAN SPACE SHUTTLE

...HERMES MANNED SPACEPLANE

...VOSKHOD MANNED SPACECRAFT

...VOSKHOD 1 SPACECRAFT

...VOSKHOD 2 SPACECRAFT

...VOSTOK SPACECRAFT

...VOSTOK 1 SPACECRAFT

...VOSTOK 2 SPACECRAFT

...VOSTOK 3 SPACECRAFT

...VOSTOK 4 SPACECRAFT

...VOSTOK 5 SPACECRAFT

...VOSTOK 6 SPACECRAFT

BOOSTER ROCKET ENGINES

BOOSTGLIDE VEHICLES

EXPENDABLE STAGES (SPACECRAFT)

HYPERSONIC VEHICLES

INERTIAL UPPER STAGE

INTERIM STAGES (SPACECRAFT)

LIFTING REENTRY VEHICLES

MANEUVERABLE SPACECRAFT

MANNED SPACECRAFT

MILITARY SPACECRAFT

RENDEZVOUS SPACECRAFT

SPACE CAPSULES

% SPACECRAFT

SPACECRAFT RECOVERY

UNMANNED SPACECRAFT

% WINGED VEHICLES

% RECOVERY

O101 0201 1202 3105 3407

SN (USE OF A MORE SPECIFIC TERM IS

RECOMMENDED--CONSULT THE TERMS

LISTED BELOW)

RT BOOSTER RECOVERY

GAS RECOVERY

LOOP TRANSFER RECOVERY

MATERIALS RECOVERY

NUCLEAR FUEL REPROCESSING

OIL RECOVERY

PRESSURE RECOVERY

RECLAMATION

RECOVERABILITY

RECOVERABLE LAUNCH VEHICLES

RECOVERY PARACHUTES

RETRIEVAL

REUSE

SPACECRAFT RECOVERY

STRESS RELAXATION

STRESS RELIEVING

VISUAL DISCRIMINATION

RECOVERY PARACHUTES

O208 1102 3110

GS

PARACHUTES

RT #RECOVERY PARACHUTES

BOOSTER RECOVERY

DISCOVERER RECOVERY CAPSULES

RECOVERABLE LAUNCH VEHICLES

% RECOVERY

RIBBON PARACHUTES

SPACECRAFT RECOVERY

## RECOVERY VEHICLES

O206

SN (EXCLUDES RECOVERABLE VEHICLES)

RT HELICOPTERS

% MILITARY VEHICLES

TRUCKS

% VEHICLES

## RECOVERY ZONES

1102 3105

RT DOWNRANGE

LANDING SITES

REENTRY RANGE

REGIONS

SPACECRAFT RECOVERY

## RECREATION

O408 3406

RT MORALE

PARKS

RELAXATION (PHYSIOLOGY)

REST

STARSITE PROGRAM

URBAN PLANNING

URBAN RESEARCH

## RECRYSTALLIZATION

1704 2601 3303

GS CRYSTALLIZATION

#RECRYSTALLIZATION

RT ANNEALING

HEAT TREATMENT

LASER ANNEALING

% METALLURGY

NUCLEATION

POLYGONIZATION

% SEPARATION

## RECTANGLES

1902

GS

GEOMETRY

. EUCLIDEAN GEOMETRY

.. POLYGONS

... TETRAGONS

...#RECTANGLES

RT RECTANGULAR PLANFORMS



# NASA THESAURUS HIERARCHICAL UPDATE

```

RECTANGULAR BEAMS
  3202 3203
    GS STRUCTURAL MEMBERS
      .BEAMS (SUPPORTS)
      .#RECTANGULAR BEAMS
    RT BOX BEAMS

RECTANGULAR COORDINATES
  USE CARTESIAN COORDINATES

RECTANGULAR DRAINAGE
  USE DRAINAGE PATTERNS

RECTANGULAR PANELS
  0101 2309 3202 3203
    GS PANELS
      #RECTANGULAR PANELS
      PLANFORMS
      .RECTANGULAR PLANFORMS
      .#RECTANGULAR PANELS
    RT STRAKES
      STRUCTURAL MEMBERS
      WING PANELS

RECTANGULAR PLANFORMS
  0101 3202 3203
    GS PLANFORMS
      #RECTANGULAR PLANFORMS
      .RECTANGULAR PANELS
      .RECTANGULAR PLATES
      .RECTANGULAR WINGS
    RT RECTANGLES
      WING PLANFORMS

RECTANGULAR PLATES
  0101 3202 3203
    GS PLANFORMS
      .RECTANGULAR PLANFORMS
      .#RECTANGULAR PLATES
      STRUCTURAL MEMBERS
      .PLATES (STRUCTURAL MEMBERS)
      .RECTANGULAR PLATES
      FLAT PLATES
      METAL PLATES
      % PLATES

RECTANGULAR WAVEGUIDES
  0710 2402
    GS WAVEGUIDES
      #RECTANGULAR WAVEGUIDES
      BEAM WAVEGUIDES
      MICROWAVE FILTERS

RECTANGULAR WIND TUNNELS
  1106 1110
    GS TEST FACILITIES
      .WIND TUNNELS
      .#RECTANGULAR WIND TUNNELS
    RT SUBSONIC WIND TUNNELS

RECTANGULAR WINGS
  0101 0202
    UF STRAIGHT WINGS
    GS AIRFOILS
      .WINGS
      .UNSWEEP WINGS
      .#RECTANGULAR WINGS
    PLANFORMS
      .RECTANGULAR PLANFORMS
      .#RECTANGULAR WINGS

RECTENNAS
  1502
    UF RECTIFIER ANTENNAS
    GS MICROWAVE EQUIPMENT
      .MICROWAVE ANTENNAS
      .RECTENNAS
    RT SATELLITE POWER TRANSMISSION
      SOLAR RADIATION
      SPACETENNAS

RECTIFICATION
  3407
    GS #RECTIFICATION
      .GEOMETRIC RECTIFICATION (IMAGERY)
    RT % CONDENSATION
      DISTILLATION
      PURIFICATION
      REFINING

RECTIFIER ANTENNAS
  USE RECTENNAS

RECTIFIERS
  0902 0905
    SN (EXCLUDES PHOTOGRAPHIC RECTIFIER)
    GS #RECTIFIERS
      .AVALANCHE DIODES
      .CRYOSAR
      .GERMANIUM RECTIFIERS
      .GERMANIUM DIODES
      .IGNITRONS
      .THYRATRONS
      .THYRISTORS
      .SILICON CONTROLLED RECTIFIERS
      BARRITT DIODES
      CURRENT CONVERTERS (AC TO DC)
      DIODES
      ELECTRON TUBES

RECTIFYING
  0602 1701 1703 1704 1801 1804 1805
    1809 1810 1811 3407
    RT ECONOMY
      EXTRACTION
      MATERIALS RECOVERY
      NUCLEAR FUEL REPROCESSING
      % PROCESSING
      RECLAMATION
      REFINING
      RESOURCES
      SOLVOLYSIS
      SPENT FUELS

RED ARCS
  1302 2903 3008
    GS ATMOSPHERIC RADIATION
      .AURORAS
      .AURORAL ARCS
      .#RED ARCS
    RT % ARCS

% ENERGY SOURCES
  FORM FACTORS
  ITO (SEMICONDUCTORS)
  MERCURY ARCS
  METAL OXIDE SEMICONDUCTORS
  % POWER SUPPLIES
  POWER SUPPLY CIRCUITS
  SEMICONDUCTOR DEVICES
  SOLID STATE DEVICES
  THIN FILMS

RECTUM
  0405
  GS ANATOMY
    .DIGESTIVE SYSTEM
    .GASTROINTESTINAL SYSTEM
    .INTESTINES
    .#RECTUM

RECUPERATORS
  USE REGENERATORS

RECURSION FORMULAS
  USE RECURSIVE FUNCTIONS

RECURSIVE FUNCTIONS
  1902
    UF RECURSION FORMULAS
    GS FUNCTIONS (MATHEMATICS)
      #RECURSIVE FUNCTIONS
    RT FIR FILTERS
      LISP (PROGRAMMING LANGUAGE)
      STRANGE ATTRACTORS

RECYCLING
  0602 1701 1703 1704 1801 1804 1805
    1809 1810 1811 3407
    RT ECONOMY
      EXTRACTION
      MATERIALS RECOVERY
      NUCLEAR FUEL REPROCESSING
      % PROCESSING
      RECLAMATION
      REFINING
      RESOURCES
      SOLVOLYSIS
      SPENT FUELS

RECTUM
  0405
  GS ANATOMY
    .DIGESTIVE SYSTEM
    .GASTROINTESTINAL SYSTEM
    .INTESTINES
    .#RECTUM

RECUPERATORS
  USE REGENERATORS

RECURSION FORMULAS
  USE RECURSIVE FUNCTIONS

RECURSIVE FUNCTIONS
  1902
    UF RECURSION FORMULAS
    GS FUNCTIONS (MATHEMATICS)
      #RECURSIVE FUNCTIONS
    RT FIR FILTERS
      LISP (PROGRAMMING LANGUAGE)
      STRANGE ATTRACTORS

RECYCLING
  0602 1701 1703 1704 1801 1804 1805
    1809 1810 1811 3407
    RT ECONOMY
      EXTRACTION
      MATERIALS RECOVERY
      NUCLEAR FUEL REPROCESSING
      % PROCESSING
      RECLAMATION
      REFINING
      RESOURCES
      SOLVOLYSIS
      SPENT FUELS

RED ARCS
  1302 2903 3008
    GS ATMOSPHERIC RADIATION
      .AURORAS
      .AURORAL ARCS
      .#RED ARCS
    RT % ARCS
  
```

[illegible]

[illegible]

AEROTHERMOCHEMISTRY  
 AEROTHERMODYNAMICS  
 HYPERSONIC REENTRY  
 LOW OBSERVABLE REENTRY VEHICLES  
 % PHYSICS  
 PLASMA SHEATHS  
 % SCIENCE  
  
 REENTRY RANGE  
 1203 3105 3501  
 GS DISTANCE  
 #REENTRY RANGE  
 RT MISSILE RANGES  
 RECOVERY ZONES  
  
 REENTRY SHIELDING  
 3105 3305 3501  
 GS SHIELDING  
 .HEAT SHIELDING  
 .#REENTRY SHIELDING  
 RT ABLATION  
 ABLATIVE NOSE CONES  
 AERODYNAMIC HEATING  
 AEROTHERMOCHEMISTRY  
 HEAT SINKS  
 % INSULATED STRUCTURES  
 LUDOX (TRADEMARK)  
 NOSE CONES  
 REUSABLE HEAT SHIELDING  
 SPACECRAFT SHIELDING  
 THERMAL CONTROL COATINGS  
 THERMAL INSULATION  
 THERMAL PROTECTION  
  
 REENTRY TRAJECTORIES  
 0101 1904 3006 3105  
 GS TRAJECTORIES  
 .DESCENT TRAJECTORIES  
 .#REENTRY TRAJECTORIES  
 RT CIRCUMLUNAR TRAJECTORIES  
 FLIGHT MECHANICS  
 HYPERBOLIC REENTRY  
 MISSILE TRAJECTORIES  
 MOON-EARTH TRAJECTORIES  
 SPACECRAFT TRAJECTORIES  
 TERMINAL GUIDANCE  
  
 REENTRY VEHICLES  
 3105 3501  
 UF REENTRY BODIES  
 GS #REENTRY VEHICLES  
 .BOOSTGLIDE VEHICLES  
 .X-20 AIRCRAFT  
 .LOW OBSERVABLE REENTRY VEHICLES  
 .MANEUVERABLE REENTRY BODIES

...LIFTING REENTRY VEHICLES  
 ...FDL-5 REENTRY VEHICLE  
 ...HL-10 REENTRY VEHICLE  
 ...HLD-35 REENTRY VEHICLE  
 ...JANUS SPACECRAFT  
 ...M-2 LIFTING BODY  
 ...M-2F2 LIFTING BODY  
 ...X-20 AIRCRAFT  
 ...X-24 AIRCRAFT  
 .MARK 1 REENTRY BODY  
 .MARK 2 REENTRY BODY  
 .MARK 3 REENTRY BODY  
 .MARK 4 REENTRY BODY  
 .MARK 5 REENTRY BODY  
 .MARK 6 REENTRY BODY  
 .MARK 11 REENTRY BODY  
 .MARK 12 REENTRY BODY  
 .MARK 17 REENTRY BODY  
 .RECOVERABLE SPACECRAFT  
 ..APOLLO SPACECRAFT  
 ...APOLLO LUNAR EXPERIMENT MODULE  
 ..ASTRO VEHICLE  
 ..GEMINI B SPACECRAFT  
 ..GEMINI SPACECRAFT  
 ...GEMINI (GT-1) SPACECRAFT  
 ...GEMINI 2 SPACECRAFT  
 ..MERCURY SPACECRAFT  
 ...AURORA 7  
 ...FAITH 7  
 ...FRIENDSHIP 7  
 ...SIGMA 7  
 ..REUSABLE SPACECRAFT  
 ...AEROSPACE PLANES  
 ...HOTOL LAUNCH VEHICLE  
 ....X-30 VEHICLE  
 ...MARS (MANNED REUSABLE SPACECRAFT)  
 ...SPACE SHUTTLE ORBITERS  
 ...ATLANTIS (ORBITER)  
 ...CHALLENGER (ORBITER)  
 ...COLUMBIA (ORBITER)  
 ...DISCOVERY (ORBITER)  
 ...ENDEAVOUR (ORBITER)  
 ...ENTERPRISE (ORBITER)  
 ...SPACE SHUTTLES  
 ...BURAN SPACE SHUTTLE  
 ...HERMES MANNED SPACEPLANE  
 ...VOSKHOD MANNED SPACECRAFT  
 ...VOSKHOD 1 SPACECRAFT  
 ...VOSKHOD 2 SPACECRAFT  
 ..VOSTOK SPACECRAFT  
 ...VOSTOK 1 SPACECRAFT  
 ...VOSTOK 2 SPACECRAFT  
 ...VOSTOK 3 SPACECRAFT  
 ...VOSTOK 4 SPACECRAFT  
  
 ...LIFTING REENTRY VEHICLES  
 ...VOSTOK 5 SPACECRAFT  
 ...VOSTOK 6 SPACECRAFT  
 .REENTRY DECOYS  
 .TRAILBLAZER 1 REENTRY VEHICLE  
 .TRAILBLAZER 2 REENTRY VEHICLE  
 .X-17 REENTRY VEHICLE  
 ABLATIVE NOSE CONES  
 AEROTHERMOCHEMISTRY  
 ATHENA ROCKET VEHICLE  
 % BALLISTIC VEHICLES  
 BLUFF BODIES  
 % BODIES  
 FERRY SPACECRAFT  
 % FLIGHT VEHICLES  
 % HYPERSONIC VEHICLES  
 % INSULATED STRUCTURES  
 LANDING MODULES  
 LIFTING BODIES  
 MANEUVERABLE SPACECRAFT  
 MISSILES  
 NOSE CONES  
 PYRAMIDAL BODIES  
 % ROCKETS  
 SPACE CAPSULES  
 % SPACECRAFT  
 SPACECRAFT CONFIGURATIONS  
 TERMINAL GUIDANCE  
 TEST VEHICLES  
 % VEHICLES  
 % WINGED VEHICLES  
  
 REFERENCE ATMOSPHERES  
 1301  
 UF STANDARD ATMOSPHERES  
 GS MODELS  
 .ATMOSPHERIC MODELS  
 .#REFERENCE ATMOSPHERES  
 STANDARDS  
 #REFERENCE ATMOSPHERES  
  
 REFERENCE STARS  
 1901 2103 3001  
 GS CELESTIAL BODIES  
 .STARS  
 .#REFERENCE STARS  
 RT ASTRONOMICAL COORDINATES  
 ASTRONOMICAL PHOTOGRAPHY  
 CELESTIAL NAVIGATION  
 NAVIGATION AIDS  
 SPACE NAVIGATION  
  
 % REFERENCE SYSTEMS  
 3405  
 SN (USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS

# NASA THESAURUS HIERARCHICAL UPDATE

RT LISTED BELOW)  
 BIBLIOGRAPHIES  
 CELESTIAL REFERENCE SYSTEMS  
 COORDINATES  
 DOCUMENTATION  
 INDEXES (DOCUMENTATION)  
 INERTIAL REFERENCE SYSTEMS  
 LIBRARIES  
 SPHERICAL COORDINATES  
 % SYSTEMS  
 WISWESSER NOTATIONS  
 REFERENCES (STANDARDS)  
 USE STANDARDS  
 REFILLING  
 3407  
 GS FILLING  
 #REFILLING  
 RT % LOADING  
 REPLENISHMENT  
 REFINING  
 0602 0604 1504 1704  
 GS #REFINING  
 .ELECTROREFINING  
 .ELECTROSLAG REFINING  
 RT ALKYLATION  
 BENEFICIATION  
 CHEMICAL FRACTIONATION  
 CLEAN FUELS  
 CLEANING  
 % CONVERSION  
 CRYSTALLIZATION  
 DESULFURIZING  
 DEWAXING  
 DISTILLATION  
 DROP TRANSFER  
 ENERGY POLICY  
 ENRICHMENT  
 EXTRACTION  
 FRACTIONATION  
 HYDROGENATION  
 HYDROMETALLURGY  
 ISOMERIZATION  
 MATERIALS RECOVERY  
 POLYMERIZATION  
 % PROCESSING  
 PURIFICATION  
 PYROMETALLURGY  
 RECTIFICATION  
 RECYCLING  
 % REDUCTION  
 % SEPARATION  
 SMELTING

SUBLIMATION  
 UPGRADING  
 ZONE MELTING  
 REFLECTANCE  
 2306 2310  
 UF REFLECTION COEFFICIENT  
 REFLECTIVITY  
 GS ELECTROMAGNETIC PROPERTIES  
 .OPTICAL PROPERTIES  
 .#REFLECTANCE  
 ...BIDIRECTIONAL REFLECTANCE  
 ...SPECTRAL REFLECTANCE  
 ABSORPTANCE  
 ALBEDO  
 ATTENUATION COEFFICIENTS  
 BIREFRINGENCE  
 BISTATIC REFLECTIVITY  
 BRIGHTNESS  
 COARSENESS  
 COSMIC RAY ALBEDO  
 EARTH ALBEDO  
 FLOW COEFFICIENTS  
 GEOMETRICAL THEORY OF DIFFRACTION  
 LUSTER  
 OPTICAL MEASUREMENT  
 OPTICAL REFLECTION  
 PHOTOMETRY  
 RAY TRACING  
 REFLECTION  
 REFLECTOMETERS  
 SURFACE PROPERTIES  
 SURFACE ROUGHNESS EFFECTS  
 TRANSMITTANCE  
 VEGETATIVE INDEX  
 REFLECTED RADIATION  
 USE REFLECTED WAVES  
 REFLECTED RAYS  
 USE REFLECTED WAVES  
 REFLECTED WAVES  
 0705 0710 2306 2310  
 UF REFLECTED RADIATION  
 REFLECTED RAYS  
 RT CORPUSCULAR RADIATION  
 ELASTIC WAVES  
 ELECTROMAGNETIC RADIATION  
 INCIDENT RADIATION  
 OPTICAL REFLECTION  
 PHOTON BEAMS  
 % RADIATION  
 REFRACTED WAVES  
 RETROREFLECTION

WAVE REFLECTION  
 REFLECTING TELESCOPES  
 1412 2306 3001  
 GS  
 #REFLECTING TELESCOPES  
 ..LARGE DEPLOYABLE REFLECTOR  
 ..STARSAT TELESCOPE  
 CASSEGRAIN OPTICS  
 MIRRORS  
 OPTICAL EQUIPMENT  
 OPTICAL MEASURING INSTRUMENTS  
 PARABOLOID MIRRORS  
 REFLECTORS  
 SCHMIDT TELESCOPES  
 SPECTROSCOPIC TELESCOPES  
 STRATOSCOPE TELESCOPES  
 REFLECTION  
 0705 0710 2305 2307 2310 2402 2405  
 GS #REFLECTION  
 .INFRARED REFLECTION  
 .OPTICAL REFLECTION  
 .RETROREFLECTION  
 .SIGNAL REFLECTION  
 .SPECULAR REFLECTION  
 .SPREAD REFLECTION  
 .ULTRAVIOLET REFLECTION  
 .WAVE REFLECTION  
 ..MACH REFLECTION  
 BIDIRECTIONAL REFLECTANCE  
 BREWSTER ANGLE  
 DEFLECTION  
 DIFFUSION  
 ECHELLETTE GRATINGS  
 ECHELLE GRATINGS  
 ELECTROMAGNETIC ABSORPTION  
 ELECTROMAGNETIC RADIATION  
 IMPINGEMENT  
 LAMBERT SURFACE  
 LIGHT (VISIBLE RADIATION)  
 % OPTICS  
 REFLECTANCE  
 REFRACTION  
 SCATTERING  
 TRANSMISSION  
 ZERO SOUND  
 REFLECTION COEFFICIENT  
 USE REFLECTANCE  
 REFLECTION NEBULAE  
 3009  
 GS CELESTIAL BODIES  
 .NEBULAE

[illegible]

[illegible]

..RHENIUM  
...RHENIUM ISOTOPES  
..TANTALUM  
...TANTALUM ISOTOPES  
..TUNGSTEN  
...TUNGSTEN ISOTOPES  
REFRACTORY MATERIALS  
#REFRACTORY METALS  
..CHROMIUM  
...CHROMIUM ISOTOPES  
..IRIDIUM  
...IRIDIUM ISOTOPES  
..MOLYBDENUM  
...MOLYBDENUM ISOTOPES  
..NIOBIUM  
...NIOBIUM ISOTOPES  
...NIOBIUM 95  
..OSMIUM  
...OSMIUM ISOTOPES  
..RHENIUM  
...RHENIUM ISOTOPES  
..TANTALUM  
...TANTALUM ISOTOPES  
..TUNGSTEN  
...TUNGSTEN ISOTOPES  
RT HEAT RESISTANT ALLOYS  
TRANSITION METALS

REFRACTORY PERIOD  
0710 2306 2309 2402  
RT REACTION TIME  
RT % RELAXATION  
RESPONSES  
TIME LAG

REFRASIL (TRADEMARK)  
USE FIBERS  
SILICON DIOXIDE

REFRIGERANTS  
1803 2303 3303  
RT ABSORBERS (MATERIALS)  
RT ABSORBERS (MATERIALS)  
ABSORPTION COOLING  
AIR CONDITIONING  
AMMONIA  
BRINES  
COOLANTS  
COOLING SYSTEMS  
FLUOROCARBONS  
FREON  
ICE  
REFRIGERATING  
REFRIGERATING MACHINERY  
REFRIGERATORS  
SOLID NITROGEN

REFRIGERATING  
1803 2303 3303 0504  
RT AIR CONDITIONING  
RT AIR COOLING  
COLD TRAPS  
CONDENSING  
COOLERS  
COOLING  
COOLING SYSTEMS  
CRYOGENIC COOLING  
CRYOGENIC EQUIPMENT  
CRYOGENICS  
DEFROSTING  
DEHUMIDIFICATION  
FREEZING  
FREON  
FROZEN FOODS  
HUMIDITY  
LOW TEMPERATURE  
MAGNETIC COOLING  
PRESERVING  
REFRIGERANTS  
REFRIGERATORS  
TEMPERATURE  
TEMPERATURE CONTROL  
TEMPERATURE DISTRIBUTION  
THERMOELECTRIC COOLING  
VENTILATION

REFRIGERATING  
1803 2303 3303 3404  
GS #REFRIGERATING MACHINERY  
GS #REFRIGERATING MACHINERY  
REFRIGERATORS  
RT ABSORBERS (EQUIPMENT)  
RT ABSORBERS (EQUIPMENT)  
AIR CONDITIONING  
AIR CONDITIONING EQUIPMENT  
BLOWERS  
COMPRESSORS  
CONDENSERS (LIQUEFIERS)  
COOLERS  
COOLING SYSTEMS  
CRYOGENIC EQUIPMENT  
EVAPORATORS  
HEAT PUMPS  
% MACHINERY  
REFRIGERANTS  
TEMPERATURE CONTROL  
THERMOELECTRIC COOLING

REFRIGERATORS  
1504 1803 2303 3303  
GS #REFRIGERATING MACHINERY  
GS #REFRIGERATORS  
RT COOLERS  
RT DEFROSTING

REFSAT  
1901  
GS ARTIFICIAL SATELLITES  
NAVIGATION SATELLITES  
REFSAT  
RT NAVSTAR SATELLITES  
SYNCHRONOUS SATELLITES

REFUELING  
0302 1102  
UF FUELING  
GS #REFUELING  
RT AIR TO AIR REFUELING  
RT AIRCRAFT HAZARDS  
FLIGHT OPERATIONS  
FUEL CONSUMPTION  
FUEL CONTAMINATION  
FUEL CONTROL  
FUEL SYSTEMS  
GROUND SUPPORT EQUIPMENT  
PREFLIGHT OPERATIONS  
PROPELLANT TRANSFER  
REPLENISHMENT  
RETRACTABLE EQUIPMENT

% REGENERATION  
0403 0404 0408  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT REGENERATION (ENGINEERING)  
RT REGENERATION (PHYSIOLOGY)  
REGENERATION (ENGINEERING)  
2311 3404  
UF REGENERATIVE CYCLES  
RT % GENERATION  
POSITIVE FEEDBACK  
RECLAMATION  
% REGENERATION  
REGENERATION (PHYSIOLOGY)  
0403 0404 0408  
UF BIOREGENERATION  
RT PHYSIOLOGY  
% REGENERATION  
REGENERATIVE COOLING  
1803 2808 3303 3501  
GS COOLING  
#REGENERATIVE COOLING  
RT HEAT EXCHANGERS



# NASA THESAURUS HIERARCHICAL UPDATE

PRECOOLING  
 REGENERATORS  
 REGENERATIVE CYCLES  
 USE REGENERATION (ENGINEERING)  
 REGENERATIVE FEEDBACK  
 USE POSITIVE FEEDBACK  
 REGENERATIVE FUEL CELLS  
 O302 0602 3304  
 GS  
 ELECTRIC GENERATORS  
 DIRECT POWER GENERATORS  
 FUEL CELLS  
 REGENERATIVE FUEL CELLS  
 ELECTROCHEMICAL CELLS  
 FUEL CELLS  
 REGENERATIVE FUEL CELLS  
 BIOCHEMICAL FUEL CELLS  
 PHOSPHORIC ACID FUEL CELLS  
 STORAGE BATTERIES

RT  
 BIOCHEMICAL FUEL CELLS  
 PHOSPHORIC ACID FUEL CELLS  
 STORAGE BATTERIES

REGENERATORS  
 2806 3303 3501  
 UF RECUPERATORS  
 GS REGENERATORS  
 THERMOSIPHONS  
 ENERGY STORAGE  
 HEAT EXCHANGERS  
 HEAT SINKS  
 REGENERATIVE COOLING  
 TUBE HEAT EXCHANGERS

REGGE POLES  
 2311 2401 2402 2403 2405  
 RT ANGULAR MOMENTUM  
 POLES  
 POMERANCHUK THEOREM  
 POMERONS  
 SCATTERING CROSS SECTIONS

REGIMES  
 3403  
 RT  
 COMMUNITIES  
 CULTURE (SOCIAL SCIENCES)  
 ENVIRONMENTS  
 GOVERNMENTS  
 NATIONS  
 POLITICS

REGIONAL PLANNING  
 3406  
 GS  
 PLANNING  
 REGIONAL PLANNING  
 URBAN PLANNING

RT  
 CONSERVATION  
 FARMLANDS  
 FOREST MANAGEMENT  
 FORESTS  
 HARBORS  
 HIGHWAYS  
 INDUSTRIAL AREAS  
 LAKES  
 LAND MANAGEMENT  
 MEGALOPOLISES  
 PARKS  
 RESIDENTIAL AREAS  
 RURAL AREAS  
 RURAL LAND USE  
 ST LOUIS-KANSAS CITY CORRIDOR (MO)  
 SUBURBAN AREAS  
 URBAN DEVELOPMENT  
 URBAN TRANSPORTATION

REGIONS  
 1305 3406  
 UF ZONES  
 GS REGIONS  
 AURORAL ZONES  
 BRILLOUIN ZONES  
 CENTRAL ATLANTIC REGION (US)  
 D REGION  
 E REGION  
 E-1 LAYER  
 E-2 LAYER  
 SPORADIC E LAYER  
 EQUATORIAL REGIONS  
 F REGION  
 F 1 REGION  
 F 2 REGION  
 FRESNEL REGION  
 GUTENBERG ZONE  
 HABITATS  
 INTERTROPICAL CONVERGENT ZONES  
 LUMBAR REGION  
 M REGION  
 NEW ENGLAND (US)  
 NULL ZONES  
 PACIFIC NORTHWEST (US)  
 PANAMA CANAL ZONE  
 PELAGIC ZONE  
 POLAR REGIONS  
 ANTARCTIC REGIONS  
 MCMURDO SOUND  
 ROSS ICE SHELF  
 ARCTIC REGIONS  
 REMOTE REGIONS  
 ANTARCTIC REGIONS  
 ARCTIC REGIONS  
 SAND HILLS REGION (GA-NC-SC)

REGISTERS  
 0801 1001  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT REGISTERS (AIR CIRCULATION)  
 REGISTERS (COMPUTERS)

REGISTERS (AIR CIRCULATION)  
 1504  
 RT COOLING SYSTEMS  
 REGISTERS  
 REGISTERS (COMPUTERS)  
 0801 1001  
 GS COMPUTER STORAGE DEVICES  
 REGISTERS (COMPUTERS)  
 ACCUMULATORS (COMPUTERS)  
 RT CENTRAL PROCESSING UNITS  
 RECORDERS  
 REGISTERS  
 SHIFT REGISTERS

REGOLITH  
 3004 1306  
 GS ROCKS  
 REGOLITH  
 RT BASALT  
 BEDROCK  
 BRECCIA  
 CARBONACEOUS ROCKS  
 COAL  
 EARTH MANTLE  
 EARTH RESOURCES  
 ENSTATITE  
 GEOLOGY

## NASA THESAURUS HIERARCHICAL UPDATE

|                                       |                                  |                     |                                        |
|---------------------------------------|----------------------------------|---------------------|----------------------------------------|
| IGNEOUS ROCKS                         | % PROPERTIES                     | RT                  | BIOCONTROL SYSTEMS                     |
| LAVA                                  | TREND ANALYSIS                   |                     | CALMODULIN                             |
| LITHOLOGY                             |                                  |                     | % CONTROL                              |
| LUNAR GEOLOGY                         | REGULATION                       |                     | HORMONES                               |
| LUNAR MANTLE                          | USE CONTROL                      |                     | THERMOREGULATION                       |
| LUNAR ROCKS                           |                                  |                     |                                        |
| MAGMA                                 | REGULATIONS                      |                     |                                        |
| OLIVINE                               | 3403                             | REGULUS MISSILE     |                                        |
| PERIDOTITE                            | RT                               | 3101 3401           |                                        |
| PYROXENES                             | AIR LAW                          | GS                  | MISSILES                               |
| ROCK INTRUSIONS                       | ALLOWANCES                       |                     | . SURFACE TO SURFACE MISSILES          |
| SELENOLOGY                            | % CONTROL                        |                     | . #REGULUS MISSILE                     |
| STRATIGRAPHY                          | COPYRIGHTS                       | RT                  | SOLID PROPELLANT ROCKET ENGINES        |
|                                       | CRIME                            |                     | TURBOJET ENGINES                       |
|                                       | LAW (JURISPRUDENCE)              |                     |                                        |
|                                       | LIABILITIES                      | REHEATING           |                                        |
|                                       | LICENSING                        | USE HEATING         |                                        |
|                                       | PATENT POLICY                    |                     |                                        |
|                                       | PENALTIES                        | REIGNITION          |                                        |
|                                       | POLICE                           | USE IGNITION        |                                        |
|                                       | POLICIES                         |                     |                                        |
|                                       | PROCUREMENT POLICY               | REINFORCED PLASTICS |                                        |
|                                       | PROHIBITION                      | 1809 3202           |                                        |
|                                       | RULES                            | GS                  | COMPOSITE MATERIALS                    |
|                                       |                                  |                     | . POLYMER MATRIX COMPOSITES            |
|                                       | REGULATORS                       |                     | . #REINFORCED PLASTICS                 |
|                                       | 1003                             |                     | . . . CARBON FIBER REINFORCED PLASTICS |
|                                       | SN                               |                     | . . . GLASS FIBER REINFORCED PLASTICS  |
|                                       | GS                               |                     | . . . MICARTA                          |
|                                       | (LIMITED TO DEVICES)             |                     | PLASTICS                               |
|                                       | #REGULATORS                      |                     | #REINFORCED PLASTICS                   |
|                                       | CURRENT REGULATORS               |                     | . . CARBON FIBER REINFORCED PLASTICS   |
|                                       | FLOW REGULATORS                  |                     | . . GLASS FIBER REINFORCED PLASTICS    |
|                                       | FUEL FLOW REGULATORS             |                     | . . MICARTA                            |
|                                       | FREQUENCY CONTROL                | RT                  | AIRCRAFT SURVIVABILITY                 |
|                                       | AUTOMATIC FREQUENCY CONTROL      |                     | ARAMID FIBER COMPOSITES                |
|                                       | GIBBERELLINS                     |                     | ARAMID FIBERS                          |
|                                       | OXYGEN REGULATORS                |                     | BORON FIBERS                           |
|                                       | PRESSURE REGULATORS              |                     | BORON REINFORCED MATERIALS             |
|                                       | RELIEF VALVES                    |                     | FIBER COMPOSITES                       |
|                                       | SPEED REGULATORS                 |                     | GRAPHITE-EPDXY COMPOSITES              |
|                                       | THERMOSTATS                      |                     | HYBRID COMPOSITES                      |
|                                       | VOLTAGE REGULATORS               |                     | LAMINATES                              |
|                                       | ACTUATORS                        |                     | REINFORCEMENT (STRUCTURES)             |
|                                       | AUTOMATIC CONTROL                |                     | THERMOSETTING RESINS                   |
|                                       | AUTOMATIC CONTROL VALVES         |                     |                                        |
|                                       | % CONTROL                        |                     |                                        |
|                                       | CONTROLLERS                      |                     |                                        |
|                                       | CRYOSTATS                        | REINFORCED PLATES   |                                        |
|                                       | SPEED CONTROL                    | 3202 3203           |                                        |
|                                       |                                  | GS                  | STRUCTURAL MEMBERS                     |
|                                       | REGULATORY MECHANISMS (BIOLOGY)  |                     | . PLATES (STRUCTURAL MEMBERS)          |
|                                       | 0506                             |                     | . #REINFORCED PLATES                   |
|                                       | SN                               | RT                  | ANISOTROPIC PLATES                     |
|                                       | (RESTRICTED TO THE REGULATION OF |                     | CORRUGATED PLATES                      |
|                                       | PHYSIOLOGICAL AND PHYSIOCHEMICAL |                     | LAMINATES                              |
|                                       | PROCESSES--EXCLUDES ECOLOGICAL,  |                     | PLASTIC PLATES                         |
|                                       | GENETIC, OR BIOTECHNOLOGICAL     |                     | REINFORCEMENT (STRUCTURES)             |
|                                       | REGULATION)                      |                     |                                        |
| REGRESSION (STATISTICS)               |                                  |                     |                                        |
| USE REGRESSION ANALYSIS               |                                  |                     |                                        |
| REGRESSION ANALYSIS                   |                                  |                     |                                        |
| 0410 1902 1905                        |                                  |                     |                                        |
| UF REGRESSION (STATISTICS)            |                                  |                     |                                        |
| GS STATISTICAL ANALYSIS               |                                  |                     |                                        |
| . VARIANCE (STATISTICS)               |                                  |                     |                                        |
| . . MULTIVARIATE STATISTICAL ANALYSIS |                                  |                     |                                        |
| . . #REGRESSION ANALYSIS              |                                  |                     |                                        |
| RT AUTOREGRESSIVE PROCESSES           |                                  |                     |                                        |
| CLUMPS                                |                                  |                     |                                        |
| CORRELATION                           |                                  |                     |                                        |
| COVARIANCE                            |                                  |                     |                                        |
| EXPERIMENT DESIGN                     |                                  |                     |                                        |
| FACTOR ANALYSIS                       |                                  |                     |                                        |
| FORECASTING                           |                                  |                     |                                        |
| LEAST SQUARES METHOD                  |                                  |                     |                                        |
| QUALITY CONTROL                       |                                  |                     |                                        |
| SIGNIFICANCE                          |                                  |                     |                                        |
| STATISTICAL TESTS                     |                                  |                     |                                        |
| VARIABILITY                           |                                  |                     |                                        |
| REGRESSION COEFFICIENTS               |                                  |                     |                                        |
| 1902 1905                             |                                  |                     |                                        |
| GS COEFFICIENTS                       |                                  |                     |                                        |
| #REGRESSION COEFFICIENTS              |                                  |                     |                                        |
| CORRELATION                           |                                  |                     |                                        |
| FORECASTING                           |                                  |                     |                                        |
| MATHEMATICAL MODELS                   |                                  |                     |                                        |
| QUALITY CONTROL                       |                                  |                     |                                        |
| REGULARITY                            |                                  |                     |                                        |
| 0408 3408                             |                                  |                     |                                        |
| RT CONTINUITY (MATHEMATICS)           |                                  |                     |                                        |
| CONVERGENCE                           |                                  |                     |                                        |
| IRREGULARITIES                        |                                  |                     |                                        |
| % NORMALIZING                         |                                  |                     |                                        |
| % PATTERNS                            |                                  |                     |                                        |
| PERIODIC VARIATIONS                   |                                  |                     |                                        |
| PHYSIOLOGY                            |                                  |                     |                                        |

# NASA THESAURUS HIERARCHICAL UPDATE

## REINFORCED SHELLS

O201 3202 3203  
 GS SHELLS (STRUCTURAL FORMS)  
 #REINFORCED SHELLS  
 RT ANISOTROPIC SHELLS  
 CORRUGATED SHELLS  
 CYLINDRICAL SHELLS  
 FLUID FILLED SHELLS  
 HEMISPHERICAL SHELLS  
 LIQUID FILLED SHELLS  
 METAL SHELLS  
 ORTHOTROPIC SHELLS  
 PLASTIC SHELLS  
 REINFORCEMENT (STRUCTURES)  
 REINFORCEMENT RINGS  
 SHELL STABILITY  
 SPHERICAL SHELLS  
 THIN WALLED SHELLS  
 TOROIDAL SHELLS  
 WIND TUNNEL WALLS

## % REINFORCEMENT

3203 3406 3407  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT REINFORCEMENT (PSYCHOLOGY)  
 REINFORCEMENT (STRUCTURES)

## REINFORCEMENT (PSYCHOLOGY)

O410  
 GS #REINFORCEMENT (PSYCHOLOGY)  
 .REWARD (PSYCHOLOGY)  
 RT LEARNING  
 MOTIVATION  
 % REINFORCEMENT  
 SELF STIMULATION

## REINFORCEMENT (STRUCTURES)

3203  
 RT BULKHEADS  
 COMPOSITE MATERIALS  
 FILLERS  
 LONGERONS  
 REINFORCED PLASTICS  
 REINFORCED PLATES  
 REINFORCED SHELLS  
 % REINFORCEMENT  
 REINFORCEMENT RINGS  
 RIBS (SUPPORTS)  
 RIGID STRUCTURES  
 RING STRUCTURES  
 STIFFENING  
 STRAKES

## STRINGERS

STRUCTURAL MEMBERS  
 STRUCTURAL STABILITY  
 STRUCTURAL STRAIN  
 SUPPORTS  
 THICK WALLS  
 WIRE  
 WIRE CLOTH

## REINFORCEMENT RINGS

3202 3203  
 GS RING STRUCTURES  
 #REINFORCEMENT RINGS  
 RT REINFORCED SHELLS  
 REINFORCEMENT (STRUCTURES)  
 RIBS (SUPPORTS)  
 % RINGS

## REINFORCING FIBERS

1507 1704 1811 3202  
 GS FIBERS  
 #REINFORCING FIBERS  
 ..ARAMID FIBERS  
 ..BORON FIBERS  
 ..CARBON FIBERS

## BORON REINFORCED MATERIALS

RT  
 BRAIDED COMPOSITES  
 CARBON FIBER REINFORCED PLASTICS  
 CARBON-CARBON COMPOSITES  
 CERAMIC FIBERS  
 CERAMIC MATRIX COMPOSITES  
 COMPOSITE MATERIALS  
 DACRON (TRADEMARK)  
 DEBONDING (MATERIALS)  
 FIBER COMPOSITES  
 FIBER ORIENTATION  
 FIBER VOLUME FRACTION  
 GLASS FIBER REINFORCED PLASTICS  
 GLASS FIBERS  
 GRAPHITE-EPOXY COMPOSITES  
 HYBRID COMPOSITES  
 LAY-UP

## METAL FIBERS

METAL MATRIX COMPOSITES  
 MICROMECHANICS  
 REINFORCING MATERIALS  
 RESIN TRANSFER MOLDING  
 SUPERHYBRID MATERIALS  
 SYNTHETIC FIBERS  
 WHISKER COMPOSITES  
 WOVEN COMPOSITES

## REINFORCING MATERIALS

1801  
 RT ARAMID FIBERS

## COMPOSITE MATERIALS

FABRICS  
 FIBER COMPOSITES  
 FIBERS  
 % FILAMENTS  
 % MATERIALS  
 MATRIX MATERIALS  
 PARTICULATE REINFORCED COMPOSITES  
 REINFORCING FIBERS

## REISSNER THEORY

3203  
 RT PLATES (STRUCTURAL MEMBERS)  
 STRESS ANALYSIS  
 % THEORIES

## REISSNER-NORDSTROM SOLUTION

1902 3009  
 RT ASTRONOMICAL MODELS  
 BLACK HOLES (ASTRONOMY)  
 CHARGED PARTICLES  
 GRAVITATIONAL EFFECTS  
 RELATIVITY

## REJECTION

1505 3404 3407  
 RT ACCEPTABILITY  
 ELIMINATION  
 EVALUATION  
 EXCLUSION  
 REMOVAL  
 SELECTION

## % RELATIONSHIPS

O410 1902 3406  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 UF INTERRELATIONSHIPS  
 RT APPROXIMATION  
 DUALITY THEOREM  
 HOMOMOLOGY  
 STRESS-STRAIN RELATIONSHIPS

## RELATIVE BIOLOGICAL EFFECTIVENESS (RBE)

O401 0408 0411  
 UF RBE  
 GS BIOLOGICAL EFFECTS  
 #RELATIVE BIOLOGICAL EFFECTIVENESS  
 (RBE)  
 RT % BIOLOGY  
 PHYSIOLOGICAL EFFECTS

## RELATIVISTIC EFFECTS

2308 2311 3304 3009

```

RT  DIMENSIONS
% EFFECTS
MASS
RELATIVITY
TIME
VELOCITY

RELATIVISTIC ELECTRON BEAMS
2403
UF  REB
GS  BEAMS (RADIATION)
    . PARTICLE BEAMS
    .. ELECTRON BEAMS
    ... #RELATIVISTIC ELECTRON BEAMS
        PARTICLES
    . CORPUSCULAR RADIATION
    .. ELECTRON RADIATION
    ... ELECTRON BEAMS
    ... #RELATIVISTIC ELECTRON BEAMS
    . RELATIVISTIC PARTICLES
    . #RELATIVISTIC ELECTRON BEAMS
    . BEAM PLASMA AMPLIFIERS
    . BETA PARTICLES
    . CONTROLLED FUSION
    . DIFFRACTION RADIATION
    . ELECTRON BOMBARDMENT
    . ELECTRON SCATTERING
    . INERTIAL FUSION (REACTOR)
    . IONIZING RADIATION
    . PLASMA HEATING
    . PLASMA JETS
    . PLASMA-PARTICLE INTERACTIONS

RELATIVISTIC PARTICLES
2308 2403 3009
GS  PARTICLES
    #RELATIVISTIC PARTICLES
    .. RELATIVISTIC ELECTRON BEAMS
    RT  HAMILTON-JACOBI EQUATION

RELATIVISTIC PLASMAS
2308 2403 2502 3009
GS  PARTICLES
    . CHARGED PARTICLES
    .. ENERGETIC PARTICLES
    ... PLASMAS (PHYSICS)
    ... #RELATIVISTIC PLASMAS
    RT  ASTRON THERMONUCLEAR REACTOR
        BREMSSTRAHLUNG
        COSMIC PLASMA
        ELECTRON PLASMA
        ELECTRON-POSITRON PLASMAS
        GRAVITATIONAL COLLAPSE
        HIGH TEMPERATURE PLASMAS

RELATIVISTIC VELOCITY
2308 2403 3009
GS  RATES (PER TIME)
    #RELATIVISTIC VELOCITY
    VELOCITY
    #RELATIVISTIC VELOCITY
    RT  HIGH SPEED
        % HYPERVELOCITY
        LIGHT SPEED
        PARTICLE MOTION

RELATIVITY
1902 2308 2311 3009
UF  GEOMETRODYNAMICS
    SPACE-TIME CONTINUUM
    RT  BIG BANG COSMOLOGY
        CONTINUUMS
        DIFFERENTIAL GEOMETRY
        EVENT HORIZON
        FIELD THEORY (PHYSICS)
        GRAND UNIFIED THEORY
        GRAVITATIONAL LENSES
        GRAVITY PROBE B
        INERTIAL REFERENCE SYSTEMS
        LIGHT-CONE EXPANSION
        LORENTZ CONTRACTION
        NAKED SINGULARITIES
        NONRELATIVISTIC MECHANICS
        PARADOXES
        PONDEROMOTIVE FORCES
        QUANTUM MECHANICS
        REISSNER-NORDSTROM SOLUTION
        RELATIVISTIC EFFECTS
        SCHWARZSCHILD METRIC
        SPACE-TIME FUNCTIONS
        STRING THEORY
        SUPERGRAVITY
        TENSOR ANALYSIS
        UNIFIED FIELD THEORY

% RELAXATION
2308 2401 2404 3407
SN  (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS

PINCH EFFECT
PLASMA JETS
PLASMA RADIATION
PLASMA-PARTICLE INTERACTIONS
PONDEROMOTIVE FORCES

RELATIVISTIC THEORY
2308 2403
UF  WIGHTMAN THEORY
RT  % THEORIES

RELATIVISTIC VELOCITY
2308 2403 3009
GS  RATES (PER TIME)
    #RELATIVISTIC VELOCITY
    VELOCITY
    #RELATIVISTIC VELOCITY
    RT  HIGH SPEED
        % HYPERVELOCITY
        LIGHT SPEED
        PARTICLE MOTION

RELATIVITY
1902 2308 2311 3009
UF  GEOMETRODYNAMICS
    SPACE-TIME CONTINUUM
    RT  BIG BANG COSMOLOGY
        CONTINUUMS
        DIFFERENTIAL GEOMETRY
        EVENT HORIZON
        FIELD THEORY (PHYSICS)
        GRAND UNIFIED THEORY
        GRAVITATIONAL LENSES
        GRAVITY PROBE B
        INERTIAL REFERENCE SYSTEMS
        LIGHT-CONE EXPANSION
        LORENTZ CONTRACTION
        NAKED SINGULARITIES
        NONRELATIVISTIC MECHANICS
        PARADOXES
        PONDEROMOTIVE FORCES
        QUANTUM MECHANICS
        REISSNER-NORDSTROM SOLUTION
        RELATIVISTIC EFFECTS
        SCHWARZSCHILD METRIC
        SPACE-TIME FUNCTIONS
        STRING THEORY
        SUPERGRAVITY
        TENSOR ANALYSIS
        UNIFIED FIELD THEORY

% RELAXATION
2308 2401 2404 3407
SN  (USE OF A MORE SPECIFIC TERM IS
    RECOMMENDED--CONSULT THE TERMS

LISTED BELOW)
RT  CROSS RELAXATION
    MOLECULAR RELAXATION
    REFRACTORY PERIOD
    RELAXATION (MECHANICS)
    RELAXATION (PHYSIOLOGY)
    RELAXATION METHOD (MATHEMATICS)

RELAXATION (MECHANICS)
2401 2404
GS  #RELAXATION (MECHANICS)
    . SPIN-LATTICE RELAXATION
    . STRESS RELAXATION
    RT  % EQUILIBRIUM
        EXPANSION
        MAGNETIC RELAXATION
        MOLECULAR RELAXATION
        NUCLEAR RELAXATION
        % REDUCTION
        RELAXATION METHOD (MATHEMATICS)
        RELAXATION TIME
        RESIDUAL STRESS
        STRAIN ENERGY RELEASE RATE
        VISCOELASTICITY
        VISCOPLASTICITY

RELAXATION (PHYSIOLOGY)
0408
RT  COMPRESSIBILITY EFFECTS
    MASSAGING
    RECREATION
    % RELAXATION
    WORK-REST CYCLE

RELAXATION METHOD (MATHEMATICS)
2308 3203 3501
GS  ANALYSIS (MATHEMATICS)
    . NUMERICAL ANALYSIS
    .. APPROXIMATION
    ... #RELAXATION METHOD (MATHEMATICS)
    RT  COMPUTATIONAL FLUID DYNAMICS
        % METHODOLOGY
        % RELAXATION
        RELAXATION (MECHANICS)

RELAXATION OSCILLATORS
0904
GS  OSCILLATORS
    #RELAXATION OSCILLATORS
    .. PHANTASTRONS

RELAXATION TIME
2307 2308 3203
GS  TIME
    #RELAXATION TIME

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |                              |                           |
|------------------------------------|------------------------------|---------------------------|
| RT % EQUILIBRIUM                   | EMPTYING                     | QUALITY                   |
| EXCITATION                         | EXHAUST EMISSION             | QUALITY CONTROL           |
| MAXWELL BODIES                     | MATERIALS HANDLING           | REDUNDANCY                |
| MOLECULAR RELAXATION               | RELIEVING                    | REDUNDANT COMPONENTS      |
| SPIN-LATTICE RELAXATION            | SCATTERING                   | RISK                      |
| TIME CONSTANT                      | SPILLING                     | SAFETY FACTORS            |
|                                    | UNLOADING                    | SAMPLING                  |
|                                    | VENTING                      | SPECIFICATIONS            |
| % RELAY                            |                              | STABILITY                 |
| 0904 0905 0702                     |                              | STANDARDS                 |
| SN (USE OF A MORE SPECIFIC TERM IS | RELIABILITY                  | STATISTICAL ANALYSIS      |
| RECOMMENDED--CONSULT THE TERMS     | 1505 3408 4001               | STATISTICAL DISTRIBUTIONS |
| LISTED BELOW)                      | GS #RELIABILITY              | STATISTICAL TESTS         |
| RT DISCONNECT DEVICES              | .AIRCRAFT RELIABILITY        | % STATISTICS              |
| ELECTRIC CONTACTS                  | .CIRCUIT RELIABILITY         | SYSTEM EFFECTIVENESS      |
| ELECTRIC RELAYS                    | .COMPONENT RELIABILITY       | SYSTEMS COMPATIBILITY     |
| LOGIC CIRCUITS                     | .SOFTWARE RELIABILITY        | SYSTEMS ENGINEERING       |
| RADIO RELAY SYSTEMS                | ..COMPUTER PROGRAM INTEGRITY | % TESTS                   |
| REPEATERS                          | .SPACECRAFT RELIABILITY      | TOLERANCES (MECHANICS)    |
|                                    | .STRUCTURAL RELIABILITY      | TOTAL QUALITY MANAGEMENT  |
| RELAY SATELLITES                   | ACCEPTABILITY                | VALIDITY                  |
| 0702 0706 3107                     | ACCURACY                     | VARIABILITY               |
| GS ARTIFICIAL SATELLITES           | AIRCRAFT SURVIVABILITY       | VULNERABILITY             |
| .COMMUNICATION SATELLITES          | ALLOWANCES                   |                           |
| ..RELAY SATELLITES                 | ASSURANCE                    | RELIABILITY ANALYSIS      |
| ...RELAY 1 SATELLITE               | CENSORED DATA (MATHEMATICS)  | 1505 3408                 |
| ...RELAY 2 SATELLITE               | COMPUTER SYSTEMS PERFORMANCE | RT % ANALYZING            |
| ADVENT PROJECT                     | CONFIDENCE                   | DESIGN ANALYSIS           |
| THOR DELTA LAUNCH VEHICLE          | CONFIDENCE LIMITS            | PERFORMANCE PREDICTION    |
| TRANSOCEANIC COMMUNICATION         | CONSISTENCY                  | SOFTWARE RELIABILITY      |
|                                    | CUMULATIVE DAMAGE            | TREND ANALYSIS            |
|                                    | % DESIGN                     |                           |
| RELAY 1 SATELLITE                  | DESIGN ANALYSIS              | RELIABILITY CONTROL       |
| 0702 0706 3107                     | DOWNTIME                     | USE QUALITY CONTROL       |
| GS ARTIFICIAL SATELLITES           | DURABILITY                   | RELIABILITY ENGINEERING   |
| .COMMUNICATION SATELLITES          | DYNAMIC CHARACTERISTICS      |                           |
| ..RELAY SATELLITES                 | ERRORS                       |                           |
| ..RELAY 1 SATELLITE                | ESTIMATES                    | RELIABILITY ENGINEERING   |
|                                    | EXPECTATION                  | 1505 1905 3404 4001       |
| RELAY 2 SATELLITE                  | FAILURE ANALYSIS             | UF RELIABILITY CONTROL    |
| 0702 0706 3107                     | FORECASTING                  | RT COMPLEX SYSTEMS        |
| GS ARTIFICIAL SATELLITES           | MAINTAINABILITY              | % ENGINEERING             |
| .COMMUNICATION SATELLITES          | MAINTENANCE                  | FAULT DETECTION           |
| ..RELAY SATELLITES                 | MAXIMUM LIKELIHOOD ESTIMATES | FAULT TOLERANCE           |
| ..RELAY 2 SATELLITE                | MECHANICAL PROPERTIES        | PERFORMANCE PREDICTION    |
|                                    | MISSILE DESIGN               | QUALITY CONTROL           |
| RELEASING                          | MTBF                         | SNEAK CIRCUIT ANALYSIS    |
| 3407                               | NONDESTRUCTIVE TESTS         | SYSTEM EFFECTIVENESS      |
| GS #RELEASING                      | PERFORMANCE                  | SYSTEM IDENTIFICATION     |
| .FIBER RELEASE                     | PERFORMANCE PREDICTION       | SYSTEMS COMPATIBILITY     |
| RT DECOUPLING                      | PRECISION                    | SYSTEMS ENGINEERING       |
| % DISCHARGE                        | PRELAUNCH PROBLEMS           | TOTAL QUALITY MANAGEMENT  |
| DISCONNECT DEVICES                 | PROBABILITY THEORY           | VALUE ENGINEERING         |
| DISPERSING                         | PRODUCT DEVELOPMENT          |                           |
| DUMPING                            | PRODUCTION MANAGEMENT        |                           |
| EJECTION                           | PRODUCTIVITY                 |                           |
| EMISSION                           |                              |                           |

RELIC RADIATION  
3001

|                                     |                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                  | ASTRONOMY<br>ASTROPHYSICS<br>BACKGROUND RADIATION<br>BIG BANG COSMOLOGY<br>EXTRATERRESTRIAL RADIATION<br>% RADIATION<br>UNIVERSE                                                                                                                                    | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MAGNETIC PERMEABILITY<br>MAGNETORESISTIVITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| RELIEF MAPS<br>1303 1305 3001<br>GS | #RELIEF MAPS<br>HYP SOGRAPHY<br>PHOTOGRAMMETRY<br>PHOTOMAPS<br>TOPOGRAPHY                                                                                                                                                                                           | RELUCTIVITY<br>USE RELUCTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DYNAMIC CHARACTERISTICS<br>ELECTRIC CONTROL<br>ELECTRONIC CONTROL<br>ENGINE CONTROL<br>FLIGHT CONTROL<br>GROUND BASED CONTROL<br>GUIDANCE (MOTION)<br>HYDRAULIC CONTROL<br>% INSTRUMENTS<br>KALMAN-SCHMIDT FILTERING<br>MANIPULATORS<br>MANUAL CONTROL<br>MISSILE CONTROL<br>OPTICAL CONTROL<br>PNEUMATIC CONTROL<br>REMOTE MANIPULATOR SYSTEM<br>ROCKET ENGINE CONTROL<br>SATELLITE CONTROL<br>SERVOCONTROL<br>SERVOMECHANISMS<br>SPACECRAFT CONTROL<br>TELEOPERATORS<br>TELEROBOTICS<br>TEMPERATURE CONTROL<br>TURBOJET ENGINE CONTROL<br>VISUAL CONTROL |
| RELIEF VALVES<br>1504<br>GS         | REGULATORS<br>#RELIEF VALVES<br>VALVES<br>.AUTOMATIC CONTROL VALVES<br>.RELIEF VALVES<br>AUTOMATIC CONTROL<br>BYPASSES<br>FUEL TANK PRESSURIZATION<br>FUEL VALVES<br>GAS VALVES<br>HYDRAULIC EQUIPMENT<br>PRESSURE REGULATORS<br>REACTOR SAFETY<br>VENTING<br>VENTS | REMANENCE<br>2307<br>GS<br>MAGNETIC PROPERTIES<br>#REMANENCE<br>RT<br>FLUX DENSITY<br>PALEOMAGNETISM<br><br>REMELTING<br>USE MELTING<br>O702 0705 0710<br>RT<br>DEMODULATION<br>INTERMODULATION<br>MODULATION<br><br>REMOTE CONSOLES<br>O701 0801<br>GS<br>CONSOLES<br>#REMOTE CONSOLES<br>DATA PROCESSING EQUIPMENT<br>.PERIPHERAL EQUIPMENT (COMPUTERS)<br>.REMOTE CONSOLES<br>COMPUTER COMPONENTS<br>COMPUTER GRAPHICS<br>DATA LINKS<br>DATA PROCESSING TERMINALS<br>DISPLAY DEVICES<br>PLOTTERS<br>READOUT | % INSTRUMENTS<br>KALMAN-SCHMIDT FILTERING<br>MANIPULATORS<br>MANUAL CONTROL<br>MISSILE CONTROL<br>OPTICAL CONTROL<br>PNEUMATIC CONTROL<br>REMOTE MANIPULATOR SYSTEM<br>ROCKET ENGINE CONTROL<br>SATELLITE CONTROL<br>SERVOCONTROL<br>SERVOMECHANISMS<br>SPACECRAFT CONTROL<br>TELEOPERATORS<br>TELEROBOTICS<br>TEMPERATURE CONTROL<br>TURBOJET ENGINE CONTROL<br>VISUAL CONTROL                                                                                                                                                                            |
| RELIEVING<br>3407<br>GS             | #RELIEVING<br>.STRESS RELIEVING<br>EXHAUSTING<br>PURGING<br>RELEASING                                                                                                                                                                                               | REMOTE<br>3502<br>GS<br>MANIPULATOR SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | REMOTE HANDLING<br>1002 1201 1410 3404<br>UF TELECHIRICS<br>GS MATERIALS HANDLING<br>#REMOTE HANDLING<br>RT MANIPULATORS<br>PAYLOAD DEPLOYMENT & RETRIEVAL<br>SYSTEM<br>TELEOPERATORS                                                                                                                                                                                                                                                                                                                                                                      |
| RELOCATION<br>1502 2002 2103<br>RT  | INSTALLING<br>POSITIONING<br>REPLACING                                                                                                                                                                                                                              | REMOTE<br>3502<br>GS<br>MANIPULATORS<br>#REMOTE MANIPULATOR SYSTEM<br>PAYLOAD DEPLOYMENT & RETRIEVAL<br>SYSTEM<br>#REMOTE MANIPULATOR SYSTEM<br>RT PAYLOAD RETRIEVAL (STS)<br>REMOTE CONTROL<br>SPACE MAINTENANCE<br>SPACE TRANSPORTATION SYSTEM<br>% SYSTEMS                                                                                                                                                                                                                                                  | MANIPULATORS<br>#REMOTE MANIPULATOR SYSTEM<br>PAYLOAD DEPLOYMENT & RETRIEVAL<br>SYSTEM<br>#REMOTE MANIPULATOR SYSTEM<br>PAYLOAD RETRIEVAL (STS)<br>REMOTE CONTROL<br>SPACE MAINTENANCE<br>SPACE TRANSPORTATION SYSTEM<br>% SYSTEMS                                                                                                                                                                                                                                                                                                                         |
| RELUCTANCE<br>0408<br>UF            | RELUCTIVITY<br>GS MAGNETIC PROPERTIES<br>#RELUCTANCE                                                                                                                                                                                                                | REMOTE<br>1305<br>GS<br>REGIONS<br>#REMOTE REGIONS<br>..ANTARCTIC REGIONS                                                                                                                                                                                                                                                                                                                                                                                                                                      | REMOTE REGIONS<br>1305<br>GS<br>REGIONS<br>#REMOTE REGIONS<br>..ANTARCTIC REGIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|                |                                |                                 |                              |
|----------------|--------------------------------|---------------------------------|------------------------------|
|                | ..ARCTIC REGIONS               | AUTOMATIC WEATHER STATIONS      | EVACUATING (VACUUM)          |
| RT             | DESERTS                        | COASTAL ZONE COLOR SCANNER      | EXHAUSTING                   |
|                | MOJAVE DESERT (CA)             | CROP IDENTIFICATION             | EXPULSION                    |
|                | OFFSHORE REACTOR SITES         | CROP INVENTORIES                | EXTRACTION                   |
|                | SAHARA DESERT (AFRICA)         | DATA ACQUISITION                | MATERIALS RECOVERY           |
|                | WILDERNESS                     | DATA COLLECTION PLATFORMS       | % REDUCTION                  |
|                |                                | % DETECTORS                     | REJECTION                    |
| REMOTE SENSING |                                | EARTH RESOURCES                 | % SEPARATION                 |
| 1409           |                                | EARTHNET                        | UNLOADING                    |
| GS             | DETECTION                      | EROS (SATELLITES)               | WEAR                         |
|                | #REMOTE SENSING                | FEATURE IDENTIFICATION AND      |                              |
| RT             | AEROMAGNETISM                  | LOCATION EXPR                   | REMS                         |
|                | AIRBORNE RADAR                 | GEOGRAPHIC APPLICATIONS PROGRAM | USE RAPID EYE MOVEMENT STATE |
|                | BAND RATIOING                  | HAZE DETECTION                  |                              |
|                | CLUSTER ANALYSIS               | IMAGE CLASSIFICATION            | RENAL CALCULI                |
|                | COASTAL ZONE COLOR SCANNER     | IMAGING RADAR                   | USE CALCULI                  |
|                | DESERTIFICATION                | MEASURING INSTRUMENTS           |                              |
|                | DIFFERENTIAL ABSORPTION LIDAR  | MULTISENSOR APPLICATIONS        | RENAL FUNCTION               |
|                | DMP SATELLITES                 | OCEAN COLOR SCANNER             | O4O4 O4O5                    |
|                | EARTH OBSERVING SYSTEM (EOS)   | % PROBES                        | RT % FUNCTIONS               |
|                | EARTH RESOURCES                | RADIOMETRIC RESOLUTION          | GLOMERULUS                   |
|                | FEATURE IDENTIFICATION AND     | SATELLITE-BORNE INSTRUMENTS     | KIDNEYS                      |
|                | LOCATION EXPR                  | % SENSORS                       |                              |
|                | FIRE (CLIMATOLOGY)             | SPACEBORNE LASERS               | RENDEZVOUS                   |
|                | GEOGRAPHIC INFORMATION SYSTEMS | TRANSDUCERS                     | 3009 3407                    |
|                | IMAGE ANALYSIS                 | WILDLIFE RADIOLOCATION          | GS #RENDEZVOUS               |
|                | IMAGE CLASSIFICATION           |                                 | . SPACE RENDEZVOUS           |
|                | IMAGING SPECTROMETERS          | REMOTELY PILOTED VEHICLES       | ..ORBITAL RENDEZVOUS         |
|                | IN SITU MEASUREMENT            | O2O1 10O3 21O2 21O3             | ...EARTH ORBITAL RENDEZVOUS  |
|                | ISCCP PROJECT                  | UF RPV                          | ...LUNAR ORBITAL RENDEZVOUS  |
|                | LEAF AREA INDEX                | RT % AIRCRAFT                   | APOLLO SOYUZ TEST PROJECT    |
|                | MAPSAT                         | DAST PROGRAM                    | FLIGHT MECHANICS             |
|                | MULTISENSOR APPLICATIONS       | DRONE AIRCRAFT                  | INTERCEPTION                 |
|                | MULTISPECTRAL RESOURCE SAMPLER | HIGHLY MANEUVERABLE AIRCRAFT    | ORBITAL MECHANICS            |
|                | OSTA-3 PAYLOAD                 | JINDIVIK TARGET AIRCRAFT        |                              |
|                | PIXELS                         | OBLIQUE WINGS                   | RENDEZVOUS GUIDANCE          |
|                | PLANETARY GEOLOGY              | ORBITAL MANEUVERING VEHICLES    | O7O7 21O2 31O4 31O9          |
|                | PLANT STRESS                   | PILOTLESS AIRCRAFT              | GS GUIDANCE (MOTION)         |
|                | RECOGNITION                    | TARGET DRONE AIRCRAFT           | #RENDEZVOUS GUIDANCE         |
|                | SHUTTLE IMAGING RADAR          | VATOL AIRCRAFT                  | RT COMMAND GUIDANCE          |
|                | SPACE STATION POLAR PLATFORMS  | % VEHICLES                      | HOMING DEVICES               |
|                | SWATH WIDTH                    |                                 | INJECTION GUIDANCE           |
|                | THEMATIC MAPPERS (LANDSAT)     | REMOVAL                         | MIDCOURSE GUIDANCE           |
|                | VEGETATIVE INDEX               | 34O7                            | ORBITAL RENDEZVOUS           |
|                |                                | RT                              | SATELLITE GUIDANCE           |
|                |                                | ANODIC STRIPPING                | SPACECRAFT GUIDANCE          |
|                |                                | CANCELLATION                    | TERMINAL GUIDANCE            |
|                |                                | CARBON DIOXIDE REMOVAL          |                              |
|                |                                | CLEARING                        | RENDEZVOUS SPACECRAFT        |
|                |                                | DELETION                        | 31O4 31O7 311O 35O2          |
|                |                                | DEPLETION                       | GS MANEUVERABLE SPACECRAFT   |
|                |                                | DISPOSAL                        | #RENDEZVOUS SPACECRAFT       |
|                |                                | DISSIPATION                     | RT COLUMBUS SPACE STATION    |
|                |                                | EJECTION                        | COMMAND GUIDANCE             |
|                |                                | EMPTYING                        | FERRY SPACECRAFT             |
|                |                                | EVACUATING (TRANSPORTATION)     |                              |
| REMOTE SENSORS |                                |                                 |                              |
| 1409           |                                |                                 |                              |
| GS             | #REMOTE SENSORS                |                                 |                              |
|                | . THEMATIC MAPPERS (LANDSAT)   |                                 |                              |
| RT             | ADVANCED VERY HIGH RESOLUTION  |                                 |                              |
|                | RADIOMETER                     |                                 |                              |
|                | AGRISTARS PROJECT              |                                 |                              |
|                | AIRBORNE LASERS                |                                 |                              |
|                | AIRBORNE RADAR                 |                                 |                              |

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |                                   |                                    |
|------------------------------------|-----------------------------------|------------------------------------|
| % DISCUSSION                       | DRAWINGS                          | USE SOUTH KOREA                    |
| DOCUMENTATION                      | ENGINEERING DRAWINGS              |                                    |
| DOCUMENTS                          | LITHOGRAPHY                       | REPUBLIC OF SOUTH AFRICA           |
| INFORMATION                        | MICROFILMS                        | 3403                               |
| INFORMATION DISSEMINATION          | PHOTOGRAPHIC PROCESSING EQUIPMENT | UF SOUTH AFRICA                    |
| PAPERS                             | PHOTOGRAPHY                       | GS NATIONS                         |
| PROPOSALS                          | PRINTING                          | RT #REPUBLIC OF SOUTH AFRICA       |
| RECORDS                            | REPLICAS                          |                                    |
| SUMMARIES                          | % REPRODUCTION                    |                                    |
| SUPPLEMENTS                        | STENCIL PROCESSES                 |                                    |
| TECHNOLOGY TRANSFER                |                                   |                                    |
|                                    | REPRODUCTIVE SYSTEMS              |                                    |
| REPRESENTATIONS                    | 0404 0405                         |                                    |
| 1902 3406 3407                     | GS ANATOMY                        |                                    |
| RT CHARACTERIZATION                | .GENITOURINARY SYSTEM             | REPUBLIC OF VIETNAM                |
| DESCRIPTORS                        | .#REPRODUCTIVE SYSTEMS            | USE VIETNAM                        |
| DRAWINGS                           | ...SEX GLANDS                     |                                    |
| GRAPHS (CHARTS)                    | ....GONADS                        | REPULSION                          |
| IMAGES                             | ....OVARIES                       | USE FORCE                          |
| PHOTOGRAPHS                        | .....TESTES                       |                                    |
| SIGNATURES                         | ....PROSTATE GLAND                | REQUIREMENTS                       |
|                                    | ...UTERUS                         | 3406                               |
| % REPRODUCTION                     | RT BIRTH                          | RT SPECIFICATIONS                  |
| 0404 0702 1407 3407                | CHROMOSOMES                       | USER REQUIREMENTS                  |
| SN (USE OF A MORE SPECIFIC TERM IS | FERTILITY                         |                                    |
| RECOMMENDED--CONSULT THE TERMS     | FETUSES                           | RESCUE OPERATIONS                  |
| LISTED BELOW)                      | % REPRODUCTION                    | 0502 1102                          |
| RT FERTILIZATION                   | REPRODUCTION (BIOLOGY)            | RT AERONAUTICAL SATELLITES         |
| REPRODUCTION (BIOLOGY)             | % SYSTEMS                         | COSPAS                             |
| REPRODUCTION (COPYING)             |                                   | MAROTS (ESA)                       |
| REPRODUCTIVE SYSTEMS               | REPTILES                          | % OPERATIONS                       |
|                                    | 0402                              | SARSAT                             |
| REPRODUCTION (BIOLOGY)             | GS ANIMALS                        | SPACECRAFT RECOVERY                |
| 0402 0404                          | .VERTEBRATES                      |                                    |
| RT % BIOLOGY                       | .#REPTILES                        | RESEARCH                           |
| BIRTH                              | ...LIZARDS                        | 3404 3406 3409 1106                |
| BREEDING (REPRODUCTION)            | ...SNAKES                         | GS #RESEARCH                       |
| CELL DIVISION                      | ...TURTLES                        | .DYNAMIC PROGRAMMING               |
| EMBRYOLOGY                         | RT POIKILOthermia                 | .HIGH TEMPERATURE RESEARCH         |
| FERTILITY                          |                                   | .LINEAR PROGRAMMING                |
| FETUSES                            | REPUBLIC AIRCRAFT                 | .LOW DENSITY RESEARCH              |
| MITOSIS                            | 0207                              | .MARKET RESEARCH                   |
| PROGENY                            | GS #REPUBLIC AIRCRAFT             | .NONLINEAR PROGRAMMING             |
| % REPRODUCTION                     | .A-10 AIRCRAFT                    | .NUCLEAR RESEARCH                  |
| REPRODUCTIVE SYSTEMS               | .F-84 AIRCRAFT                    | .QUADRATIC PROGRAMMING             |
| SEX GLANDS                         | .F-105 AIRCRAFT                   | RT CRITICAL PATH METHOD            |
|                                    | RT % AIRCRAFT                     | % DESIGN                           |
| REPRODUCTION (COPYING)             |                                   | ETHICS                             |
| 1407 3405                          | REPUBLIC MILITARY AIRCRAFT        | EXPLORATION                        |
| UF DUPLICATING                     | USE MILITARY AIRCRAFT             | INTERSERVICE DATA EXCHANGE PROGRAM |
| GS IMAGERY                         |                                   | INVESTIGATION                      |
| #REPRODUCTION (COPYING)            | REPUBLIC OF CHINA                 | MINIMAX TECHNIQUE                  |
| ..XEROGRAPHY                       | USE TAIWAN                        | % RESEARCH PROJECTS                |
| BLUEPRINTS                         |                                   |                                    |
| RT DOCUMENT STORAGE                | REPUBLIC OF KOREA                 | RESEARCH AIRCRAFT                  |

## NASA THESAURUS HIERARCHICAL UPDATE

| RT        | SN | (USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW) |
|-----------|----|------------------------------------------------------------------------------|
| 0201 3404 |    | NUCLEAR PROPELLED AIRCRAFT                                                   |
| UF        |    | ROCKET PLANES                                                                |
| GS        |    | SUBMERSIBLE AIRCRAFT                                                         |
|           |    | SUPERSONIC AIRCRAFT                                                          |
|           |    | TAILLESS AIRCRAFT                                                            |
|           |    | TANDEM WING AIRCRAFT                                                         |
|           |    | TEST VEHICLES                                                                |
|           |    | TILT WING AIRCRAFT                                                           |
|           |    | V/STOL AIRCRAFT                                                              |
|           |    | VERTICAL TAKEOFF AIRCRAFT                                                    |
|           |    | % WINGED VEHICLES                                                            |
|           |    | YF-12 AIRCRAFT                                                               |
|           |    | RESEARCH AND DEVELOPMENT                                                     |
|           |    | 3404 3406 3409 4001                                                          |
|           |    | RT % DESIGN                                                                  |
|           |    | INVESTIGATION                                                                |
|           |    | MANAGEMENT PLANNING                                                          |
|           |    | OPERATIONS RESEARCH                                                          |
|           |    | OUTER SPACE TREATY                                                           |
|           |    | PROGRAMS                                                                     |
|           |    | PROJECT MANAGEMENT                                                           |
|           |    | PROPOSALS                                                                    |
|           |    | % RESEARCH PROJECTS                                                          |
|           |    | SYSTEMS ENGINEERING                                                          |
|           |    | TECHNOLOGY UTILIZATION                                                       |
|           |    | WEAPONS DEVELOPMENT                                                          |
|           |    | RESEARCH FACILITIES                                                          |
|           |    | 1106 1108 3404 3501                                                          |
|           |    | RT % FACILITIES                                                              |
|           |    | LABORATORIES                                                                 |
|           |    | % RESEARCH PROJECTS                                                          |
|           |    | SPACE INDUSTRIALIZATION                                                      |
|           |    | SPACE LABORATORIES                                                           |
|           |    | TEST FACILITIES                                                              |
|           |    | RESEARCH MANAGEMENT                                                          |
|           |    | 3404 3405 3406 3409                                                          |
|           |    | GS MANAGEMENT                                                                |
|           |    | % RESEARCH MANAGEMENT                                                        |
|           |    | ALLOCATIONS                                                                  |
|           |    | RT BLOCK DIAGRAMS                                                            |
|           |    | % BUDGETS                                                                    |
|           |    | ENGINEERING MANAGEMENT                                                       |
|           |    | FEASIBILITY ANALYSIS                                                         |
|           |    | GOALS                                                                        |
|           |    | INDUSTRIAL MANAGEMENT                                                        |
|           |    | MANPOWER                                                                     |
|           |    | OPERATIONS RESEARCH                                                          |
|           |    | PERSONNEL                                                                    |
|           |    | PRIORITIES                                                                   |
|           |    | RESEARCH PROJECTS                                                            |
|           |    | 1108 3404 3409 3501                                                          |
|           |    | % RESEARCH PROJECTS                                                          |
|           |    | METEOROLOGICAL RESEARCH AIRCRAFT                                             |
|           |    | MILITARY AIRCRAFT                                                            |
|           |    | EXPERIMENTAL AIRCRAFT                                                        |
|           |    | ORNITHOPTER AIRCRAFT                                                         |
|           |    | #RESEARCH AIRCRAFT                                                           |
|           |    | .AVIAN 2/180 AUTOIRO                                                         |
|           |    | .AVRO 707 AIRCRAFT                                                           |
|           |    | .B-70 AIRCRAFT                                                               |
|           |    | .BREGUET 940 AIRCRAFT                                                        |
|           |    | .C-8A AUGMENTOR WING AIRCRAFT                                                |
|           |    | .D-558 AIRCRAFT                                                              |
|           |    | .FD 2 AIRCRAFT                                                               |
|           |    | .FIREBEE 2 TARGET DRONE AIRCRAFT                                             |
|           |    | .H-17 HELICOPTER                                                             |
|           |    | .H-126 AIRCRAFT                                                              |
|           |    | .HP-115 AIRCRAFT                                                             |
|           |    | .NORD 1500 AIRCRAFT                                                          |
|           |    | .QUESTOL AIRCRAFT                                                            |
|           |    | .ROTOR SYSTEMS RESEARCH AIRCRAFT                                             |
|           |    | .SC-1 AIRCRAFT                                                               |
|           |    | .U-2 AIRCRAFT                                                                |
|           |    | .VZ-2 AIRCRAFT                                                               |
|           |    | .VZ-8 AIRCRAFT                                                               |
|           |    | .X-1 AIRCRAFT                                                                |
|           |    | .X-2 AIRCRAFT                                                                |
|           |    | .X-3 AIRCRAFT                                                                |
|           |    | .X-5 AIRCRAFT                                                                |
|           |    | .X-13 AIRCRAFT                                                               |
|           |    | .X-14 AIRCRAFT                                                               |
|           |    | .X-15 AIRCRAFT                                                               |
|           |    | .X-19 AIRCRAFT                                                               |
|           |    | .X-20 AIRCRAFT                                                               |
|           |    | .X-21 AIRCRAFT                                                               |
|           |    | .X-21A AIRCRAFT                                                              |
|           |    | .X-22 AIRCRAFT                                                               |
|           |    | .X-22A AIRCRAFT                                                              |
|           |    | .X-24 AIRCRAFT                                                               |
|           |    | .XH-51 HELICOPTER                                                            |
|           |    | .XV-4 AIRCRAFT                                                               |
|           |    | .XV-5 AIRCRAFT                                                               |
|           |    | .XV-8A AIRCRAFT                                                              |
|           |    | .XV-9A AIRCRAFT                                                              |
|           |    | .XV-11A AIRCRAFT                                                             |
|           |    | AEROSPACE PLANES                                                             |
|           |    | % AIRCRAFT                                                                   |
|           |    | DRONE AIRCRAFT                                                               |
|           |    | FAN IN WING AIRCRAFT                                                         |
|           |    | FLIGHT TEST VEHICLES                                                         |
|           |    | FLYING PLATFORMS                                                             |
|           |    | GROUND EFFECT MACHINES                                                       |
|           |    | HOVERCRAFT GROUND EFFECT MACHINES                                            |
|           |    | HYPERSONIC AIRCRAFT                                                          |
|           |    | JET AIRCRAFT                                                                 |
|           |    | JOINED WINGS                                                                 |
|           |    | METEOROLOGICAL RESEARCH AIRCRAFT                                             |
|           |    | % MILITARY AIRCRAFT                                                          |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>.CYCLIC COMPOUNDS</li> <li>..HETEROCYCLIC COMPOUNDS</li> <li>...ALKALOIDS</li> <li>...#RESERPINE</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>REGIONAL PLANNING</li> <li>RURAL AREAS</li> <li>SUBURBAN AREAS</li> <li>URBAN DEVELOPMENT</li> </ul>                                                                                                                                                 | <ul style="list-style-type: none"> <li>0505 0601 0603</li> <li>RT ASHES</li> <li>ORGANIC WASTES (FUEL CONVERSION)</li> <li>REACTION PRODUCTS</li> <li>SOLID WASTES</li> <li>WASTE TREATMENT</li> <li>WASTE WATER</li> <li>WASTES</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>RT ANTIHYPERTENSIVE AGENTS</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>RESIDENTIAL ENERGY</li> </ul>                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>RESERVES</li> <li>1502 1703 1805 3402 3404</li> <li>RT ABUNDANCE</li> <li>AVAILABILITY</li> <li>BACKUPS</li> <li>CONTINGENCY</li> <li>CRUDE OIL</li> <li>ECONOMIC FACTORS</li> <li>ENERGY POLICY</li> <li>ESTIMATES</li> <li>ESTIMATING</li> <li>EVALUATION</li> <li>EXPLOITATION</li> <li>EXPLORATION</li> <li>FORECASTING</li> <li>INVENTORIES</li> <li>INVENTORY CONTROLS</li> <li>% MATERIALS</li> <li>MINERAL DEPOSITS</li> <li>MINES (EXCAVATIONS)</li> <li>% PRODUCTION</li> <li>RESOURCES</li> <li>STOCKPILING</li> <li>% STORAGE</li> </ul> | <ul style="list-style-type: none"> <li>ENERGY CONSERVATION</li> <li>ENERGY TECHNOLOGY</li> <li>HEAT PUMPS</li> <li>SOLAR COOLING</li> <li>SOLAR HEATING</li> <li>SOLAR HOUSES</li> <li>SPACE COOLING (BUILDINGS)</li> <li>SPACE HEATING (BUILDINGS)</li> <li>WATER HEATING</li> </ul>       | <ul style="list-style-type: none"> <li>RESILIENCE</li> <li>3203</li> <li>GS MECHANICAL PROPERTIES</li> <li>#RESILIENCE</li> <li>RT COMPRESSIVE STRENGTH</li> <li>ELASTIC PROPERTIES</li> <li>SHEAR PROPERTIES</li> <li>SPRINGS (ELASTIC)</li> <li>TENSILE STRENGTH</li> </ul>                                                                                                                                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>% MATERIALS</li> <li>MINERAL DEPOSITS</li> <li>MINES (EXCAVATIONS)</li> <li>% PRODUCTION</li> <li>RESOURCES</li> <li>STOCKPILING</li> <li>% STORAGE</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>RESIDUAL GAS</li> <li>1203 1506</li> <li>GS GASES</li> <li>#RESIDUAL GAS</li> <li>RT GETTERS</li> <li>HIGH VACUUM</li> <li>OUTGASSING</li> <li>PARTIAL PRESSURE</li> <li>ULTRAHIGH VACUUM</li> <li>VACUUM APPARATUS</li> <li>VACUUM TUBES</li> </ul> | <ul style="list-style-type: none"> <li>RESIN BONDING</li> <li>0602 0603 1808</li> <li>GS BONDING</li> <li>#RESIN BONDING</li> <li>RT ADHESIVE BONDING</li> <li>METAL BONDING</li> <li>METAL-METAL BONDING</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li>RESERVOIRS</li> <li>0505</li> <li>SN (FOR SURFACE WATER STORAGE--NOT OIL OR GAS POOLS)</li> <li>RT DAMS</li> <li>EVAPORATION</li> <li>FRESH WATER</li> <li>LAGOONS</li> <li>LAKE TEXOMA (OK-TX)</li> <li>LAKES</li> <li>PONDS</li> <li>RIVERS</li> <li>SOLAR PONDS (HEAT STORAGE)</li> <li>STREAMS</li> <li>WATER RESOURCES</li> <li>WINDPOWERED PUMPS</li> </ul>                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>RESIDUAL STRENGTH</li> <li>3203</li> <li>RT CRACK PROPAGATION</li> <li>FATIGUE (MATERIALS)</li> <li>FRACTURE MECHANICS</li> <li>FRACTURE STRENGTH</li> <li>RESIDUAL STRESS</li> <li>% STRENGTH</li> <li>TENSILE STRENGTH</li> </ul>                  | <ul style="list-style-type: none"> <li>RESIN MATRIX COMPOSITES</li> <li>1808</li> <li>GS COMPOSITE MATERIALS</li> <li>#RESIN MATRIX COMPOSITES</li> <li>..BORON-EPOXY COMPOSITES</li> <li>..CARBON-PHENOLIC COMPOSITES</li> <li>..GRAPHITE-EPOXY COMPOSITES</li> <li>ARAMID FIBERS</li> <li>BISMALEIMIDE</li> <li>EPOXY RESINS</li> <li>HYBRID COMPOSITES</li> <li>MATRIX MATERIALS</li> <li>METAL MATRIX COMPOSITES</li> <li>PEEK</li> <li>POLYIMIDE RESINS</li> <li>POLYMER MATRIX COMPOSITES</li> <li>PREPREGS</li> <li>PULTRUSION</li> <li>RESIN TRANSFER MOLDING</li> <li>RESINS</li> <li>SHEET MOLDING COMPOUNDS</li> </ul> |
| <ul style="list-style-type: none"> <li>RESIDENTIAL AREAS</li> <li>3402</li> <li>RT CITIES</li> <li>INHABITANTS</li> <li>LAND</li> <li>LAND USE</li> <li>MEGALOPOLISES</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>RELAXATION (MECHANICS)</li> <li>RELAXATION STRENGTH</li> <li>STRAIN HARDENING</li> <li>STRESS RELAXATION</li> <li>STRESS RELIEVING</li> <li>STRESS-STRAIN RELATIONSHIPS</li> <li>TEMPERATURE INVERSIONS</li> </ul>                                   | <ul style="list-style-type: none"> <li>RESIN TRANSFER MOLDING</li> <li>1809 1810 3202 3407</li> <li>UF RTM (COMPOSITE MATERIALS)</li> <li>GS FORMING TECHNIQUES</li> <li>#RESIN TRANSFER MOLDING</li> <li>RT CASTING</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   |



# NASA THESAURUS HIERARCHICAL UPDATE

RT ..POTENTIOMETERS (RESISTORS)  
 ..PRINTED RESISTORS  
 ..THERMISTORS  
 BALLASTS (IMPEDANCES)  
 ELECTRIC CONDUCTORS  
 ELECTRIC FILTERS  
 ELECTRIC REACTORS  
 % FILAMENTS  
 PHOTOCONDUCTORS  
 SEMICONDUCTORS (MATERIALS)  
 SOLID STATE DEVICES  
 VARIATORS

RESOLUTION  
 1406 1407 1409 1412 1413 3406 3407  
 3009 3501  
 UF RESOLVING POWER  
 GS #RESOLUTION  
 .ANGULAR RESOLUTION  
 .HIGH RESOLUTION  
 .IMAGE RESOLUTION  
 .RADAR RESOLUTION  
 .RADIOMETRIC RESOLUTION  
 .SPATIAL RESOLUTION  
 .SPECTRAL RESOLUTION  
 .TEMPORAL RESOLUTION  
 ACCURACY  
 AUTOMATIC TRAFFIC ADVISORY AND  
 RESOLUTION  
 BLURRING  
 CHARACTER RECOGNITION  
 CONTRAST  
 DEFINITION  
 DYNAMIC CHARACTERISTICS  
 ERRORS  
 FOCI  
 HIGH RESOLUTION COVERAGE ANTENNAS  
 IMAGE CONTRAST  
 IMAGE ENHANCEMENT  
 LEGIBILITY  
 LOC  
 % OPTICS  
 PERCEPTION  
 % POWER  
 PRECISION  
 RESOLUTION CELL  
 SENSITIVITY  
 SPATIAL FILTERING  
 STARK EFFECT  
 % THRESHOLDS  
 TOLERANCES (MECHANICS)  
 VISIBILITY  
 VISION

RT  
 AUTOMATIC TRAFFIC ADVISORY AND  
 RESOLUTION  
 BLURRING  
 CHARACTER RECOGNITION  
 CONTRAST  
 DEFINITION  
 DYNAMIC CHARACTERISTICS  
 ERRORS  
 FOCI  
 HIGH RESOLUTION COVERAGE ANTENNAS  
 IMAGE CONTRAST  
 IMAGE ENHANCEMENT  
 LEGIBILITY  
 LOC  
 % OPTICS  
 PERCEPTION  
 % POWER  
 PRECISION  
 RESOLUTION CELL  
 SENSITIVITY  
 SPATIAL FILTERING  
 STARK EFFECT  
 % THRESHOLDS  
 TOLERANCES (MECHANICS)  
 VISIBILITY  
 VISION  
 RESOLUTION CELL

0802 1902  
 RT % CELLS  
 IMAGING TECHNIQUES  
 RADAR DETECTION  
 RADAR IMAGERY  
 RESOLUTION  
 RESOLVERS  
 2308 2311  
 RT ANALOG COMPUTERS  
 INSTRUMENT TRANSFORMERS  
 TRANSFORMERS

RESOLVING POWER  
 USE RESOLUTION  
 RESONANCE  
 0710 1003 2301 2306 2308 2311 2403  
 2502 3408  
 GS #RESONANCE  
 .BARYON RESONANCE  
 .CYCLOTRON RESONANCE  
 .MAGNETIC RESONANCE  
 .FERROMAGNETIC RESONANCE  
 .NUCLEAR MAGNETIC RESONANCE  
 .PROTON MAGNETIC RESONANCE  
 .PROTON RESONANCE  
 .PARAMAGNETIC RESONANCE  
 .ELECTRON PARAMAGNETIC RESONANCE  
 .MAGNETOSONIC RESONANCE  
 .MESON RESONANCE  
 .X MESONS  
 .MICROWAVE RESONANCE  
 .NUCLEAR QUADRUPOLE RESONANCE  
 .OPTICAL RESONANCE  
 .ORBITAL RESONANCES (CELESTIAL  
 MECHANICS)  
 .PLASMA RESONANCE  
 .RESONANT VIBRATION  
 .SPIN RESONANCE  
 FOSTER THEORY  
 OSCILLATIONS  
 OVERHAUSER EFFECT  
 RESONANT FREQUENCIES  
 SYNTONY  
 TUNING  
 VIBRATION

RT  
 FOSTER THEORY  
 OSCILLATIONS  
 OVERHAUSER EFFECT  
 RESONANT FREQUENCIES  
 SYNTONY  
 TUNING  
 VIBRATION  
 RESONANCE CHARGE EXCHANGE  
 1002 2304 2403  
 GS EXCHANGING  
 .CHARGE EXCHANGE  
 .#RESONANCE CHARGE EXCHANGE  
 RT SPIN EXCHANGE

RESONANCE FLUORESCENCE  
 1901  
 UF RESONANCE RADIATION  
 GS EMISSION  
 .LIGHT EMISSION  
 .LUMINESCENCE  
 ...FLUORESCENCE  
 ...#RESONANCE FLUORESCENCE  
 ATOMIC EXCITATIONS  
 ATOMIC PHYSICS  
 QUANTUM ELECTRODYNAMICS  
 % RADIATION

RESONANCE LINES  
 0710  
 UF DIELECTRONIC SATELLITE LINES  
 RT LINE SPECTRA  
 OPTICAL RESONANCE  
 PLASMA RESONANCE

RESONANCE PROBES  
 1302 2501 2502 3108  
 GS MEASURING INSTRUMENTS  
 #RESONANCE PROBES  
 RT IMPEDANCE PROBES  
 MAGNETIC PROBES  
 MICROWAVE PLASMA PROBES  
 PLASMA DIAGNOSTICS  
 PLASMA RESONANCE  
 TUNERS

RESONANCE RADIATION  
 USE RESONANCE FLUORESCENCE

RESONANCE SCATTERING  
 2311 2402 2403 2502  
 SN (INTERACTION WITH THE INTERIOR OF  
 THE NUCLEUS--EXCLUDES POTENTIAL  
 SCATTERING)  
 GS NUCLEAR REACTIONS  
 .NUCLEAR SCATTERING  
 .#RESONANCE SCATTERING  
 SCATTERING  
 .NUCLEAR SCATTERING  
 .#RESONANCE SCATTERING  
 INVERSE SCATTERING  
 MOSSBAUER EFFECT  
 NEUTRON SCATTERING

RESONANCE TESTING  
 0905 1406 3404  
 RT DAMPING TESTS  
 ELASTIC DAMPING  
 ELECTRONIC EQUIPMENT TESTS  
 FATIGUE TESTS

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                                  |                      |                         |                              |
|----------------------------------|----------------------|-------------------------|------------------------------|
| SITE SELECTION                   | GS                   | DISEASES                | ..LUNGS                      |
| URBAN DEVELOPMENT                |                      | #RESPIRATORY DISEASES   | ..ALVEOLI                    |
| VEGETATION                       |                      | ..AEROSINUSITIS         | ..NOSE (ANATOMY)             |
|                                  |                      | ..ASTHMA                | ..PARAMASAL SINUSES          |
| RESOURCES MANAGEMENT             |                      | ..EMPHYSEMA             | ..PHARYNX                    |
| 1301 1303 1306 1308 1310         |                      | ..INFLUENZA             | ..TRACHEA                    |
| GS                               |                      | ..PNEUMONIA             | RT EVAPORATION               |
| MANAGEMENT                       |                      | ..TUBERCULOSIS          | HOMEOSTASIS                  |
| #RESOURCES MANAGEMENT            |                      | ..BERYLLIUM POISONING   | HYPERCAPNIA                  |
| ...FOREST MANAGEMENT             | RT                   | CONGESTION              | ORGANS                       |
| ...REFORESTATION                 |                      | FUNGAL DISEASES         | PLEURAE                      |
| ..LAND MANAGEMENT                |                      | LUNG MORPHOLOGY         | PULMONARY CIRCULATION        |
| EARTH RESOURCES                  |                      | PULMONARY LESIONS       | RESPIRATION                  |
| ENVIRONMENT MANAGEMENT           |                      |                         | % SYSTEMS                    |
| ENVIRONMENTAL CONTROL            |                      |                         |                              |
| LEASING                          |                      | RESPIRATORY IMPEDANCE   | RESPIROMETERS                |
| NASA INTERACTIVE PLANNING SYSTEM | O405 O408            |                         | O401 O405 O501               |
| THERMAL RESOURCES                | GS                   | IMPEDANCE               | GS MEASURING INSTRUMENTS     |
| WATER RUNOFF                     |                      | #RESPIRATORY IMPEDANCE  | #RESPIROMETERS               |
|                                  |                      |                         | RT BIOINSTRUMENTATION        |
| RESPIRATION                      |                      | RESPIRATORY PHYSIOLOGY  | EXHALATION                   |
| O404 O408 O501 O504 3407         |                      | O404 O405 O408          |                              |
| UF APNEA                         | GS                   | PHYSIOLOGY              | RESPONDERS                   |
| GS #RESPIRATION                  | RT                   | #RESPIRATORY PHYSIOLOGY | USE TRANSPONDERS             |
| .HIGH ALTITUDE BREATHING         |                      | % SCIENCE               |                              |
| .LIQUID BREATHING                |                      |                         | RESPONSE BIAS                |
| .PRESSURE BREATHING              |                      |                         | O408 O802 1003 1409          |
| RT ALVEOLI                       | RESPIRATORY RATE     |                         | GS BIAS                      |
| ASPHYXIA                         | O405 O408            |                         | #RESPONSE BIAS               |
| % BREATHING                      | GS                   | RATES (PER TIME)        | RT DYNAMIC RESPONSE          |
| EXPIRATION                       |                      | #RESPIRATORY RATE       | ERRORS                       |
| EXPIRED AIR                      |                      | ..DYSPNEA               | % TIME RESPONSE              |
| HYDROGEN METABOLISM              |                      | ..HYPOVENTILATION       | TRANSIENT RESPONSE           |
| METABOLISM                       | RT                   | ..TACHYPNEA             |                              |
| OXYGEN METABOLISM                |                      | HYPERCAPNIA             | RESPONSE TIME (COMPUTERS)    |
| PHOTOSYNTHESIS                   |                      | HYPERPNEA               | O802 O803                    |
| PHYSIOLOGY                       |                      | SPIROMETERS             | GS TIME                      |
| RESPIRATORS                      | RESPIRATORY REFLEXES |                         | #RESPONSE TIME (COMPUTERS)   |
| RESPIRATORY SYSTEM               | O405 O408            |                         | RT COMPUTER PROGRAMMING      |
| RESUSCITATION                    | GS                   | REFLEXES                | COMPUTER SYSTEMS PERFORMANCE |
| SINUSES                          |                      | #RESPIRATORY REFLEXES   | DATA PROCESSING              |
| VALSALVA EXERCISE                |                      | ..COUGH                 |                              |
|                                  |                      | ..HERING-BREVER REFLEX  | RESPONSES                    |
| RESPIRATORS                      |                      | ..SNEEZING              | O402 O408 O410 O502          |
| O405 O501                        | RT % BREATHING       |                         | GS #RESPONSES                |
| GS                               |                      | RESPIRATORY SYSTEM      | .DYNAMIC RESPONSE            |
| #RESPIRATORS                     | O405 O408            |                         | ..TRANSIENT RESPONSE         |
| RT BREATHING APPARATUS           | GS                   | ANATOMY                 | .GALVANIC SKIN RESPONSE      |
| EMERGENCY BREATHING TECHNIQUES   |                      | #RESPIRATORY SYSTEM     | .MODAL RESPONSE              |
| RESPIRATION                      |                      | ..BRONCHI               | .PHYSIOLOGICAL RESPONSES     |
| RESUSCITATION                    |                      | ..DIAPHRAGM (ANATOMY)   | ..HEMODYNAMIC RESPONSES      |
| THERAPY                          |                      | ..LARYNX                | RT CHRONAXY                  |
|                                  |                      | ...GLOTTIS              | % FREQUENCY RESPONSE         |
| RESPIRATORY DISEASES             |                      | ...VOCAL CORDS          | LEARNING                     |
| O405                             |                      |                         | REFRACTORY PERIOD            |

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

0405 0408  
 GS ANATOMY  
 .SENSE ORGANS  
 ..EYE (ANATOMY)  
 ...#RETINA  
 ....FOVEA  
 RT ELECTRORETINOGRAPHY  
 PHOSPHENE  
 PHOTORECEPTORS  
 VISION  
 VISUAL FIELDS  
 VISUAL PIGMENTS

RT

RETINAL ADAPTATION  
 0405 0408  
 GS ADAPTATION  
 #RETINAL ADAPTATION  
 ..DARK ADAPTATION  
 ..LIGHT ADAPTATION  
 RT PERCEPTION  
 VISIBILITY  
 VISION

RETINAL IMAGES  
 0405 0408  
 GS IMAGES  
 #RETINAL IMAGES  
 RT VISION  
 VISUAL FIELDS

RETINENE  
 0403 0405 1808  
 UF VITAMIN A  
 GS ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ...#RETINENE  
 .LIPIDS  
 .#RETINENE  
 VITAMINS  
 #RETINENE  
 ALDEHYDES  
 CAROTENE  
 RT

RETIREMENT  
 0408 3402  
 RT EMPLOYEE RELATIONS  
 INDUSTRIES  
 PERSONNEL  
 SOCIOLOGY

RETIREMENT FOR CAUSE  
 3408  
 RT COMPONENT RELIABILITY  
 ENGINE PARTS

FATIGUE LIFE  
 FRACTURE STRENGTH  
 INVENTORY MANAGEMENT  
 LIFE (DURABILITY)  
 METAL FATIGUE  
 SERVICE LIFE  
 SPARE PARTS

RETORC (TORPEDOES)  
 USE TORPEDOES

RETOPT PROCESSING  
 1805  
 RT FRACTIONATION  
 HYDROCARBON FUELS  
 OILS  
 % PROCESSING  
 SHALE OIL

RETRACTABLE EQUIPMENT  
 0203 1504  
 UF RETRACTABLE LANDING GEAR  
 RT AERODYNAMIC BRAKES  
 LANDING GEAR  
 REFUELING

RETRACTABLE LANDING GEAR  
 USE LANDING GEAR  
 RETRACTABLE EQUIPMENT

RETRAINING  
 0402 0408 0502  
 UF REORIENTATION  
 RT ADAPTATION  
 EDUCATION  
 MANAGEMENT METHODS  
 MANPOWER  
 PERSONNEL  
 TASKS  
 TRAINING ANALYSIS

RETRIEVAL  
 0802 0803 3405  
 GS #RETRIEVAL  
 .DATA RETRIEVAL  
 .INFORMATION RETRIEVAL  
 .PAYLOAD RETRIEVAL (STS)  
 RT % RECOVERY  
 SEARCHING

RETROACTION  
 USE RETROTHRUST

RETROFIRING  
 2807 2808 3105 3301

GS FIRING (IGNITING)  
 .ROCKET FIRING  
 .#RETROFIRING  
 RT DECELERATION  
 RETROCKET ENGINES  
 RETROTHRUST

RETROFITTING  
 3405  
 GS #RETROFITTING  
 .ACOUSTIC RETROFITTING  
 RT INSTALLING

RETROREFLECTION  
 2306 2310 2402  
 GS REFLECTION  
 #RETROREFLECTION  
 RT ANTENNA ARRAYS  
 INCIDENT RADIATION  
 LAGEOS (SATELLITE)  
 LUNAR RETROREFLECTORS  
 REFLECTED WAVES  
 RETROREFLECTORS

RETROREFLECTORS  
 0710  
 GS RADAR EQUIPMENT  
 #RETROREFLECTORS  
 REFLECTORS  
 #RETROREFLECTORS  
 RT RADAR CORNER REFLECTORS  
 RETROREFLECTION

RETROROCKET ENGINES  
 2802 2807 2808 3105 3110  
 GS ENGINES  
 .ROCKET ENGINES  
 .#RETROROCKET ENGINES  
 ...BE-3 ENGINE  
 RT CONTROL ROCKETS  
 INTERNAL COMBUSTION ENGINES  
 LIQUID PROPELLANT ROCKET ENGINES  
 MAN OPERATED PROPULSION SYSTEMS  
 RESTARTABLE ROCKET ENGINES  
 RETROFIRING  
 RETROTHRUST  
 SOLID PROPELLANT ROCKET ENGINES

RETROTHRUST  
 2308 2802 2807 2808 3105  
 UF RETROACTION  
 GS THRUST  
 .ROCKET THRUST  
 .#RETROTHRUST  
 RT DECELERATION

## NASA THESAURUS HIERARCHICAL UPDATE

|                                      |           |                                       |    |                          |
|--------------------------------------|-----------|---------------------------------------|----|--------------------------|
| RETROFIRING                          |           | REUSABLE SPACECRAFT                   |    | ..ACOUSTIC SCATTERING    |
| RETROCKET ENGINES                    | 2808 3110 | GS                                    | RT | ..#REVERBERATION         |
|                                      |           |                                       |    | ECHOES                   |
| RETURN BEAM VIDICONS                 |           | REENTRY VEHICLES                      |    | NOISE (SOUND)            |
| 0701 0702 0905 1409                  |           | .RECOVERABLE SPACECRAFT               |    | REVERBERATION CHAMBERS   |
| GS                                   |           | .#REUSABLE SPACECRAFT                 |    | SOUND WAVES              |
| ELECTRON TUBES                       |           | ...AEROSPACE PLANES                   |    |                          |
| CAMERA TUBES                         |           | ....HOTOL LAUNCH VEHICLE              |    |                          |
| ..VIDICONS                           |           | ....X-30 VEHICLE                      |    |                          |
| ..#RETURN BEAM VIDICONS              |           | ....MARS (MANNED REUSABLE SPACECRAFT) |    | REVERBERATION CHAMBERS   |
| ....THERMICONS                       |           | ...SPACE SHUTTLE ORBITERS             |    | 0710 2301                |
| RT TELEVISION CAMERAS                |           | ....ATLANTIS (ORBITER)                |    | GS COMPARTMENTS          |
|                                      |           | ....CHALLENGER (ORBITER)              |    | .TEST CHAMBERS           |
| RETURN TO EARTH SPACE FLIGHT         |           | ....COLUMBIA (ORBITER)                |    | .#REVERBERATION CHAMBERS |
| 3004 3007 3104 3105                  |           | ....DISCOVERY (ORBITER)               |    | TEST FACILITIES          |
| GS SPACE FLIGHT                      |           | ....ENDEAVOUR (ORBITER)               |    | #REVERBERATION CHAMBERS  |
| #RETURN TO EARTH SPACE FLIGHT        |           | ....ENTERPRISE (ORBITER)              |    | RT ACOUSTIC MEASUREMENT  |
| RT INTERPLANETARY FLIGHT             |           | ...SPACE SHUTTLES                     |    | % ACOUSTIC SIMULATION    |
| MANNED MARS MISSIONS                 |           | ....BURAN SPACE SHUTTLE               |    | CHAMBERS                 |
| SPACECRAFT REENTRY                   |           | ....HERMES MANNED SPACEPLANE          |    | ENVIRONMENTAL TESTS      |
|                                      |           | EXPENDABLE STAGES (SPACECRAFT)        |    | REVERBERATION            |
| REUSABLE HEAT SHIELDING              |           | FERRY SPACECRAFT                      |    | REVERSE ENGINEERING      |
| 1704 1801 1805 3304 3305             |           | INERTIAL UPPER STAGE                  |    | 0503 OS06 4001           |
| GS SHIELDING                         |           | INTERIM STAGES (SPACECRAFT)           |    | RT COMPUTER PROGRAMMING  |
| .HEAT SHIELDING                      |           | INTERPLANETARY SPACECRAFT             |    | DESIGN ANALYSIS          |
| .#REUSABLE HEAT SHIELDING            |           | LANDING MODULES                       |    | REVERSING                |
| RT COOLING                           |           | LUNAR LANDING MODULES                 |    | SOFTWARE ENGINEERING     |
| HEAT TRANSFER                        |           | MANNED SPACECRAFT                     |    | SOFTWARE TOOLS           |
| REENTRY SHIELDING                    |           | SOFT LANDING SPACECRAFT               |    | SYSTEMS ENGINEERING      |
| SPACECRAFT SHIELDING                 |           | SPACE SHUTTLE BOOSTERS                |    |                          |
| TEMPERATURE CONTROL                  |           | UNMANNED SPACECRAFT                   |    |                          |
| THERMAL CONTROL COATINGS             |           |                                       |    |                          |
| THERMAL PROTECTION                   |           |                                       |    |                          |
|                                      |           |                                       |    |                          |
| REUSABLE LAUNCH VEHICLES             |           | REUSE                                 |    | REVERSE FIELD PINCH      |
| 3103 3110                            |           | 3407                                  |    | 2501                     |
| GS                                   |           | GS UTILIZATION                        |    | GS PINCH EFFECT          |
| LAUNCH VEHICLES                      |           | #REUSE                                |    | #REVERSE FIELD PINCH     |
| #REUSABLE LAUNCH VEHICLES            |           | ..SOFTWARE REUSE                      |    | MAGNETOHYDRODYNAMIC FLOW |
| ..SINGLE STAGE TO ORBIT VEHICLES     |           | RT OIL RECOVERY                       |    | PLASMA CONTROL           |
| ...HOTOL LAUNCH VEHICLE              |           | % RECOVERY                            |    | REACTOR TECHNOLOGY       |
| ADVANCED LAUNCH SYSTEM (STS)         |           |                                       |    | SCREW PINCH              |
| AEROMANEUVERING ORBIT TO ORBIT       |           | REVENUE                               |    | TOROIDAL PLASMAS         |
| SHUTTLE                              |           | 3402 3403                             |    |                          |
| RECOVERABLE LAUNCH VEHICLES          |           | RT ALLOCATIONS                        |    | REVERSE OSMOSIS          |
| ROCKET ENGINES                       |           | ASSESSMENTS                           |    | GS OSMOSIS               |
| SPACECRAFT LAUNCHING                 |           | BUDGETING                             |    | #REVERSE OSMOSIS         |
| SPACECRAFT RECOVERY                  |           | COSTS                                 |    | DEMNERIALIZING           |
| % VEHICLES                           |           | INTERNATIONAL TRADE                   |    | DESALINATION             |
|                                      |           |                                       |    | MEMBRANES                |
|                                      |           |                                       |    | PERMEATING               |
|                                      |           |                                       |    |                          |
| REUSABLE ROCKET ENGINES              |           | REVERBERATION                         |    | REVERSE TIME             |
| 2808                                 |           | 0710 2301                             |    | USE REACTION TIME        |
| GS                                   |           | GS                                    |    |                          |
| ENGINES                              |           | ACOUSTIC PROPERTIES                   |    | REVERSED FLOW            |
| .ROCKET ENGINES                      |           | .ACOUSTIC SCATTERING                  |    | O101 1202                |
| .#REUSABLE ROCKET ENGINES            |           | .#REVERBERATION                       |    | GS FLUID FLOW            |
| RT OXYGEN-HYDROCARBON ROCKET ENGINES |           | SCATTERING                            |    | #REVERSED FLOW           |
|                                      |           | .WAVE SCATTERING                      |    |                          |

## NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                     |                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                  | BOUNDARY LAYER SEPARATION<br>RECIRCULATIVE FLUID FLOW<br>REVERSING<br>SEPARATED FLOW           | RT                                                                                                                                                                                                                                                                                                                                                                                                                      | AERODYNAMIC CONFIGURATIONS<br>% EQUATIONS<br>NAVIER-STOKES EQUATION<br>SCALE MODELS                                                                                                                                                                                                  |
| REVERSING<br>3407                                                                                                                                   |                                                                                                | REYNOLDS LAW<br>USE REYNOLDS EQUATION                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                      |
| RT %                                                                                                                                                | DIRECTION<br>REVERSE ENGINEERING<br>REVERSED FLOW                                              | REYNOLDS NUMBER<br>O101 1201 1202 3408<br>UF CRITICAL REYNOLDS NUMBER<br>GS RATIOS                                                                                                                                                                                                                                                                                                                                      | RF-8 AIRCRAFT<br>USE F-8 AIRCRAFT<br>RH-2 HELICOPTER<br>USE UH-1 HELICOPTER<br>RHEA (ASTRONOMY)<br>3001<br>GS CELESTIAL BODIES<br>.NATURAL SATELLITES<br>..ICY SATELLITES<br>..#RHEA (ASTRONOMY)<br>..SATURN SATELLITES<br>..#RHEA (ASTRONOMY)<br>RT SATURN (PLANET)<br>SOLAR SYSTEM |
| REVIEWING<br>3405                                                                                                                                   |                                                                                                | .DIMENSIONLESS NUMBERS<br>.#REYNOLDS NUMBER<br>...HIGH REYNOLDS NUMBER<br>...LOW REYNOLDS NUMBER<br>BOUNDARY LAYER FLOW<br>BOUNDARY LAYER STABILITY<br>BOUNDARY LAYER TRANSITION<br>CRITICAL VELOCITY<br>FLUID FLOW<br>FROUDE NUMBER<br>GRASHOF NUMBER<br>INVISCID FLOW<br>LAMINAR FLOW<br>PECLET NUMBER<br>PRANDTL NUMBER<br>RICHARDSON NUMBER<br>SCALE EFFECT<br>TRANSITION POINTS<br>TURBULENT FLOW<br>VISCIOUS FLOW | RHEA (ASTRONOMY)<br>3001<br>GS CELESTIAL BODIES<br>.NATURAL SATELLITES<br>..ICY SATELLITES<br>..#RHEA (ASTRONOMY)<br>..SATURN SATELLITES<br>..#RHEA (ASTRONOMY)<br>RT SATURN (PLANET)<br>SOLAR SYSTEM                                                                                |
| REVISIONS<br>3405                                                                                                                                   |                                                                                                | RT                                                                                                                                                                                                                                                                                                                                                                                                                      | RT                                                                                                                                                                                                                                                                                   |
| UF                                                                                                                                                  | ALTERATION<br>MODIFICATION<br>ADJUSTING<br>CONTRACTS<br>CORRECTION<br>EXTENSIONS<br>VARIATIONS |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM<br>1703<br>GS CHEMICAL ELEMENTS<br>#RHENIUM<br>METALS<br>.REFRACTORY METALS<br>.#RHENIUM<br>...RHENIUM ISOTOPES<br>.TRANSITION METALS<br>.#RHENIUM<br>...RHENIUM ISOTOPES<br>REFRACTORY MATERIALS<br>REFRACTORY METALS<br>.#RHENIUM<br>...RHENIUM ISOTOPES                   |
| REVOLUTION (MOTION)<br>USE REVOLVING                                                                                                                |                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| REVOLVING<br>1403                                                                                                                                   |                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| UF                                                                                                                                                  | REVOLUTION (MOTION)<br>GYRATION<br>#REVOLVING                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| RT                                                                                                                                                  | ANGULAR VELOCITY<br>CENTRIPETAL FORCE<br>ROTATION                                              |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| REWARD (PSYCHOLOGY)<br>3402 3406                                                                                                                    |                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| GS                                                                                                                                                  | REINFORCEMENT (PSYCHOLOGY)<br>#REWARD (PSYCHOLOGY)                                             |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| RT                                                                                                                                                  | COMFORT<br>HUMAN REACTIONS<br>PSYCHOLOGICAL FACTORS                                            |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |
| REYNOLDS EQUATION<br>O101 1201 1202 1902<br>UF REYNOLDS LAW<br>GS EQUATIONS OF MOTION<br>#REYNOLDS EQUATION<br>FLOW EQUATIONS<br>#REYNOLDS EQUATION |                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                         | RHENIUM ALLOYS<br>1701<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#RHENIUM ALLOYS<br>REFRACTORY MATERIALS<br>REFRACTORY METAL ALLOYS<br>.#RHENIUM ALLOYS                                                                                               |

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..ISOTOPIES
..#RHENIUM ISOTOPIES
..RHENIUM
..RHENIUM ISOTOPIES
METALS
..REFRACTORY METALS
..RHENIUM
..#RHENIUM ISOTOPIES
..TRANSITION METALS
..RHENIUM
..#RHENIUM ISOTOPIES
REFRACTORY MATERIALS
..REFRACTORY METALS
..RHENIUM
..#RHENIUM ISOTOPIES
RT RADIOACTIVE ISOTOPIES

RHEOCASTING
1504
GS FORMING TECHNIQUES
..CASTING
..#RHEOCASTING
RT ALLOYS
CAST ALLOYS
DIES
FORGING
SLURRIES
SOLIDIFICATION

RHEOELECTRICAL SIMULATION
1001 1108
GS SIMULATION
#RHEOELECTRICAL SIMULATION
RT ANALOG CIRCUITS
ANALOG SIMULATION
BIONICS
FLOW DISTRIBUTION

RHEOENCEPHALOGRAPHY
0405 0408 0501
RT BLOOD CIRCULATION
BRAIN
BRAIN CIRCULATION

RHEOLOGY
1202 2603
RT ELECTORRHEOLOGICAL FLUIDS
FLOW MEASUREMENT
FLOW THEORY
% FLUIDS
LIQUID FLOW
MAXWELL FLUIDS
NONNEWTONIAN FLUIDS
PLASTIC FLOW
PLASTIC PROPERTIES

VISCOSITY
RHEOMETERS
0501 0905 1406 3501
GS MEASURING INSTRUMENTS
..FLOWMETERS
..#RHEOMETERS
RT BLOOD CIRCULATION

RHESUS FACTOR
0403 0404 0405
RT ANTIGENS
BLOOD
CONGENITAL ANOMALIES

RHEUMATIC DISEASES
0404 0405 0408
GS DISEASES
#RHEUMATIC DISEASES
RT ARTHRITIS

RHIZOPUS
0409
GS PLANTS (BOTANY)
..FUNGI
..#RHIZOPUS
RT BLIGHT
% MOLD

RHO-MESONS
2403 2405
GS PARTICLES
..ELEMENTARY PARTICLES
..BOSONS
...MESONS
....VECTOR MESONS
....#RHO-MESONS
...FERMIONS
...BARYONS
...#RHO-MESONS
..HADRONS
..BARYONS
...#RHO-MESONS
...MESONS
....VECTOR MESONS
....#RHO-MESONS
..NUCLEAR PARTICLES
..BOSONS
...MESONS
....VECTOR MESONS
....#RHO-MESONS
RT CHARGED PARTICLES
ETA-MESONS

RHODAMINE

RHODIUM
1701
GS ALLOYS
#RHODIUM ALLOYS
RT PLATINUM ALLOYS

RHODIUM COMPOUNDS
1804
RT % CHEMICAL COMPOUNDS
% GROUP 8 COMPOUNDS

RHODIUM ISOTOPIES
1804
UF RHODIUM 102
RHODIUM 106
GS CHEMICAL ELEMENTS
..NUCLIDES
...ISOTOPIES
...#RHODIUM ISOTOPIES
..RHODIUM
..#RHODIUM ISOTOPIES
METALS
..TRANSITION METALS
..RHODIUM

RHODESIA
USE ZIMBABWE

RHODE ISLAND
1305
GS NATIONS
..UNITED STATES
..#RHODE ISLAND
RT BLOCK ISLAND SOUND (RI)

RHODIUM
1703
GS CHEMICAL ELEMENTS
#RHODIUM
..RHODIUM ISOTOPIES
METALS
..TRANSITION METALS
..#RHODIUM
...RHODIUM ISOTOPIES

RHODIUM ALLOYS
1701
GS ALLOYS
#RHODIUM ALLOYS
RT PLATINUM ALLOYS

RHODIUM COMPOUNDS
1804
RT % CHEMICAL COMPOUNDS
% GROUP 8 COMPOUNDS

RHODIUM ISOTOPIES
1804
UF RHODIUM 102
RHODIUM 106
GS CHEMICAL ELEMENTS
..NUCLIDES
...ISOTOPIES
...#RHODIUM ISOTOPIES
..RHODIUM
..#RHODIUM ISOTOPIES
METALS
..TRANSITION METALS
..RHODIUM

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[illegible]

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

## RIGID ROTORS (PLASMA PHYSICS)

2307  
 GS #RIGID ROTORS (PLASMA PHYSICS)  
 .PLASMA PHYSICS  
 RT MOLECULAR COLLISIONS  
 MOLECULAR ROTATION  
 % PHYSICS  
 PLASMA CONTROL

## RIGID STRUCTURES

3202  
 UF INELASTIC BODIES  
 RIGID BODIES  
 STIFF STRUCTURES  
 GS #RIGID STRUCTURES  
 .RIGID ROTORS  
 .RIGID WINGS  
 RT ARCHES  
 COMPOSITE MATERIALS  
 CONCRETE STRUCTURES  
 EULER EQUATIONS OF MOTION  
 HYBRID STRUCTURES  
 PLASTIC BODIES  
 REINFORCEMENT (STRUCTURES)  
 SANDWICH STRUCTURES  
 SPACE ERECTABLE STRUCTURES  
 STEEL STRUCTURES  
 % STRUCTURES  
 TRANSLATIONAL MOTION  
 WELDED STRUCTURES

## RIGID WINGS

O102 O103 O104  
 SN (EXCLUDES 'RIGID ROTORS')  
 GS AIRFOILS  
 .WINGS  
 .#RIGID WINGS  
 RIGID STRUCTURES  
 #RIGID WINGS  
 RT AEROELASTICITY  
 FIXED WINGS  
 FLEXIBLE WINGS  
 LOW ASPECT RATIO WINGS

## % RIGIDITY

3404 3408  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT FLEXIBILITY  
 MAGNETIC RIGIDITY  
 MECHANICAL PROPERTIES  
 MODULUS OF ELASTICITY  
 RUGGEDNESS  
 STIFFNESS

## STRUCTURAL STABILITY

RILLS  
 USE VALLEYS  
 RIMS  
 O202 1101 1104 1305 1501 1504 3203  
 RT % BLADES  
 BORDERS  
 EDGES  
 MARGINS  
 SIDES

## RING CURRENTS

1002 2402 2604  
 GS ELECTRIC CURRENT  
 #RING CURRENTS  
 RT ATMOSPHERIC ELECTRICITY  
 ELECTROJETS  
 PLASMA CURRENTS

## RING DISCHARGE

1002 2402  
 GS ELECTRIC CURRENT  
 .ELECTRIC DISCHARGES  
 .TOWNSEND DISCHARGE  
 ...GAS DISCHARGES  
 ....TOROIDAL DISCHARGE  
 ....#RING DISCHARGE  
 RT % DISCHARGE  
 ELECTRODELESS DISCHARGES  
 GAS IONIZATION  
 HIGH FREQUENCIES  
 RADIO FREQUENCY DISCHARGE

## RING GALAXIES

3001 3009  
 GS CELESTIAL BODIES  
 .GALAXIES  
 .#RING GALAXIES  
 RT ELLIPTICAL GALAXIES  
 GALACTIC EVOLUTION  
 GALACTIC STRUCTURE  
 INTERACTING GALAXIES  
 SPIRAL GALAXIES

## RING LASERS

1601  
 GS STIMULATED EMISSION DEVICES  
 .LASERS  
 .#RING LASERS

## RING STRUCTURES

1504 3202  
 GS #RING STRUCTURES

## .REINFORCEMENT RINGS

.RING WINGS  
 RT AERODYNAMIC CONFIGURATIONS  
 % BANDS  
 HOOPS  
 REINFORCEMENT (STRUCTURES)  
 % RINGS  
 % STRUCTURES

## RING WINGS

O104 1204 3202  
 GS AIRFOILS  
 .WINGS  
 ..UNCAMBERED WINGS  
 ..#RING WINGS  
 ..UNSWEEP WINGS  
 ..#RING WINGS  
 RING STRUCTURES  
 #RING WINGS  
 DUCTED FANS  
 SHROUDED PROPELLERS  
 TWISTED WINGS  
 RT

## % RINGS

1504 1902 3009  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)

## RT ANNULI

BODIES OF REVOLUTION  
 CIRCLES (GEOMETRY)  
 JUPITER RINGS  
 O RING SEALS  
 PLANETARY RINGS  
 REINFORCEMENT RINGS  
 RING STRUCTURES  
 RINGS (MATHEMATICS)  
 SATURN RINGS  
 STORAGE RINGS (PARTICLE  
 ACCELERATORS)  
 TOROIDAL PLASMAS  
 TORUSES  
 URANUS RINGS  
 VORTEX RINGS

## RINGS (MATHEMATICS)

1902  
 RT % MATHEMATICS  
 % RINGS

## RIO GRANDE (NORTH AMERICA)

1305  
 GS RIVERS  
 #RIO GRANDE (NORTH AMERICA)  
 RT GULF OF MEXICO

|                                  |                                       |                                    |
|----------------------------------|---------------------------------------|------------------------------------|
| MEXICO                           | RELIABILITY                           | RIVERS                             |
| NEW MEXICO                       | STRATEGY                              | 1305                               |
| TEXAS                            |                                       | GS                                 |
|                                  | RIT ENGINES                           | #RIVERS                            |
| RIOMETERS                        | 1504                                  | .COLORADO RIVER (NORTH AMERICA)    |
| 0710 1302 1406 2301 3501         | UF RADIO FREQUENCY ION THRUSTOR       | .HUDSON RIVER (NY-NJ)              |
| GS MEASURING INSTRUMENTS         | ENGINES                               | .MISSISSIPPI RIVER (US)            |
| .RADIATION MEASURING INSTRUMENTS | GS ENGINES                            | .MISSOURI RIVER (US)               |
| .#RIOMETERS                      | .ROCKET ENGINES                       | .OHIO RIVER (US)                   |
| RT ATMOSPHERIC IONIZATION        | ..ELECTRIC ROCKET ENGINES             | .RIO GRANDE (NORTH AMERICA)        |
| AURORAL ABSORPTION               | ...ION ENGINES                        | ALLUVIUM                           |
| IONOGRAMS                        | ...#RIT ENGINES                       | AMAZON REGION (SOUTH AMERICA)      |
| IONOSONDES                       | RT ELECTROSTATIC ENGINES              | ATCHAFALAYA RIVER BASIN (LA)       |
| IONOSPHERIC NOISE                | PLASMA ENGINES                        | AUFEIS (ICE)                       |
| IONOSPHERIC PROPAGATION          |                                       | BAYOUS                             |
|                                  | RITZ AVERAGING METHOD                 | CANYONS                            |
| RIPPLES                          | 1902 2403 3501                        | COLUMBIA RIVER BASIN (ID-OR-WA)    |
| 1202 2304                        | GS ANALYSIS (MATHEMATICS)             | DELAWARE RIVER BASIN (US)          |
| GS ELASTIC WAVES                 | .NUMERICAL ANALYSIS                   | DELTA                              |
| .CAPILLARY WAVES                 | --APPROXIMATION                       | EARTH RESOURCES                    |
| .#RIPPLES                        | ..#RITZ AVERAGING METHOD              | EROSION                            |
| SURFACE WAVES                    | RT % METHODOLOGY                      | ESTUARIES                          |
| .CAPILLARY WAVES                 |                                       | FEATHER RIVER BASIN (CA)           |
| .#RIPPLES                        |                                       | INLAND WATERS                      |
| GRAVITY WAVES                    |                                       | LAKE ERIE                          |
| INTERFACIAL TENSION              |                                       | LAKE HURON                         |
| WATER WAVES                      |                                       | LAKE MICHIGAN                      |
| WIND (METEOROLOGY)               |                                       | LAKE ONTARIO                       |
|                                  |                                       | LAKE SUPERIOR                      |
| RT                               | RIVER BASINS                          | MEANDERS                           |
|                                  | 1306 1308 1305                        | MISSISSIPPI DELTA (LA)             |
|                                  | GS LANDFORMS                          | MISSOURI RIVER BASIN (US)          |
|                                  | .STRUCTURAL BASINS                    | RAPIDS                             |
|                                  | .#RIVER BASINS                        | RESERVOIRS                         |
|                                  | ...ATCHAFALAYA RIVER BASIN (LA)       | RHONE DELTA (FRANCE)               |
|                                  | ...CHENA RIVER BASIN (AK)             | RIVER BASINS                       |
|                                  | ...COLUMBIA RIVER BASIN (ID-OR-WA)    | SHOALS                             |
|                                  | ...DELAWARE RIVER BASIN (US)          | SHORELINES                         |
|                                  | ...FEATHER RIVER BASIN (CA)           | SOUNDS (TOPOGRAPHIC FEATURES)      |
|                                  | ...MISSOURI RIVER BASIN (US)          | STREAMS                            |
|                                  | ...SUSQUEHANNA RIVER BASIN (MD-NY-PA) | SURFACE WATER                      |
|                                  | ...WABASH RIVER BASIN (IL-IN-OH)      | SUSQUEHANNA RIVER BASIN (MD-NY-PA) |
|                                  | ...WADIS                              | TRIBUTARIES                        |
|                                  | AMAZON REGION (SOUTH AMERICA)         | VALLEYS                            |
|                                  | CHESAPEAKE BAY (US)                   | WABASH RIVER BASIN (IL-IN-OH)      |
|                                  | DEATH VALLEY (CA)                     | WADIS                              |
|                                  | INTERNATIONAL HYDROLOGICAL DECADE     | WATER COLOR                        |
|                                  | LAKES                                 | WATER RUNOFF                       |
|                                  | MEANDERS                              | WATERSHEDS                         |
|                                  | MISSISSIPPI RIVER (US)                | WATERWAYS                          |
|                                  | MISSOURI RIVER (US)                   | WHARVES                            |
|                                  | RAPIDS                                |                                    |
|                                  | RAVINES                               |                                    |
|                                  | RIVERS                                |                                    |
|                                  | SACRAMENTO VALLEY (CA)                |                                    |
|                                  | SAGINAW BAY (MI)                      |                                    |
|                                  | SAN JOAQUIN VALLEY (CA)               |                                    |
|                                  | SHENANDOAH VALLEY (VA)                |                                    |
|                                  | VADOSE WATER                          |                                    |
|                                  | WATERSHEDS                            |                                    |
|                                  |                                       | RIVETED JOINTS                     |
|                                  |                                       | 1504 1507 3203                     |
|                                  |                                       | GS JOINTS (JUNCTIONS)              |



## NASA THESAURUS HIERARCHICAL UPDATE

|                  |                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                       |                                                                                                                                                                                                        |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT               | #RIVETED JOINTS<br>BOLTED JOINTS<br>BUTT JOINTS<br>LAP JOINTS<br>METAL JOINTS<br>WELDED JOINTS                                                                                                                                                                      | ...HYDROGEN OXYGEN ENGINES<br>...#RL-10-A-1 ENGINE<br>...RL-10 ENGINES<br>...#RL-10-A-1 ENGINE                                                                                                                                                                                                     | GS<br>RT                                                                                                                                                                              | SURFACE VEHICLES<br>#ROADWAY POWERED VEHICLES<br>ELECTRIC BATTERIES<br>ELECTRIC MOTOR VEHICLES<br>ENERGY STORAGE                                                                                       |
| RIVETING         | 1507<br>RT %<br>JOINING<br>RIVETS<br>SEALING                                                                                                                                                                                                                        | RL-10-A-3 ENGINE<br>2804 2808<br>GS<br>ENGINES<br>.ROCKET ENGINES<br>...LIQUID PROPELLANT ROCKET ENGINES<br>...HYDROGEN OXYGEN ENGINES<br>...#RL-10-A-3 ENGINE<br>...RL-10 ENGINES<br>...#RL-10-A-3 ENGINE<br>RT SATURN D LAUNCH VEHICLE                                                           | ROASTING<br>3407<br>UF<br>RT                                                                                                                                                          | CALCINATION<br>BAKING<br>DESULFURIZING<br>DRYING<br>HEATING<br>IGNITION<br>OXIDATION<br>REDUCTION (CHEMISTRY)<br>SINTERING                                                                             |
| RIVETS           | 1504<br>GS<br>FASTENERS<br>#RIVETS<br>RT COUPLINGS<br>HOLDERS<br>PINS<br>RIVETING                                                                                                                                                                                   | RLC CIRCUITS<br>0902 1002<br>UF<br>LRC CIRCUITS<br>RLC NETWORKS<br>GS<br>CIRCUITS<br>.RL CIRCUITS<br>.#RLC CIRCUITS<br>RT CAPACITANCE<br>CAPACITANCE SWITCHES<br>ELECTRICAL RESISTANCE<br>LC CIRCUITS<br>NETWORK ANALYSIS<br>NETWORK SYNTHESIS<br>RC CIRCUITS<br>TIME CONSTANT<br>TRANSCONDUCTANCE | ROBIN BALLOONS<br>0205 3110<br>GS                                                                                                                                                     | EXPANDABLE STRUCTURES<br>.INFLATABLE STRUCTURES<br>..BALLOONS<br>...METEOROLOGICAL BALLOONS<br>...#ROBIN BALLOONS<br>HIGH ALTITUDE BALLOONS<br>RADIOSONDES<br>ROCKOONS<br>SKYHOOK BALLOONS<br>SOUNDING |
| RT               | 0902 0904<br>UF LR CIRCUITS<br>GS CIRCUITS<br>#RL CIRCUITS<br>..RLC CIRCUITS<br>COUPLING CIRCUITS<br>ELECTRICAL RESISTANCE<br>INDUCTANCE<br>LC CIRCUITS<br>NETWORK ANALYSIS<br>NETWORK SYNTHESIS<br>TIME CONSTANT<br>TRANSCONDUCTANCE                               | RLC NETWORKS<br>USE RLC CIRCUITS                                                                                                                                                                                                                                                                   | ROBOT ARMS<br>1504<br>UF<br>RT                                                                                                                                                        | ARMS (ROBOTICS)<br>END EFFECTORS<br>MANIPULATORS<br>ROBOT DYNAMICS<br>ROBOTICS<br>ROBOTS                                                                                                               |
| RL-10 ENGINES    | 2804 2808<br>GS<br>ENGINES<br>.ROCKET ENGINES<br>..LIQUID PROPELLANT ROCKET ENGINES<br>...#RL-10 ENGINES<br>...RL-10-A-1 ENGINE<br>...RL-10-A-3 ENGINE<br>ATLAS CENTAUR LAUNCH VEHICLE<br>CENTAUR PROJECT<br>CRYOGENIC ROCKET PROPELLANTS<br>SATURN LAUNCH VEHICLES | RNA<br>USE RIBONUCLEIC ACIDS<br>ROADS<br>3401 3404<br>GS<br>#ROADS<br>.HIGHWAYS<br>RT %<br>FACILITIES<br>INTERSECTIONS<br>PASSAGEWAYS<br>PAVEMENTS<br>RAPID TRANSIT SYSTEMS<br>SITE SELECTION<br>STREETS<br>TRANSPORTATION<br>TRANSPORTATION NETWORKS                                              | ROBOT CONTROL<br>1504 3404<br>RT<br>%<br>CONTROL<br>CONTROL SYSTEMS DESIGN<br>CONTROL THEORY<br>DYNAMIC CONTROL<br>FEEDBACK CONTROL<br>INVERSE KINEMATICS<br>ROBOT DYNAMICS<br>ROBOTS |                                                                                                                                                                                                        |
| RL-10-A-1 ENGINE | 2804 2808<br>GS<br>ENGINES<br>.ROCKET ENGINES<br>..LIQUID PROPELLANT ROCKET ENGINES                                                                                                                                                                                 | ROADWAY POWERED VEHICLES<br>1504                                                                                                                                                                                                                                                                   | ROBOT DYNAMICS<br>1504                                                                                                                                                                |                                                                                                                                                                                                        |

## NASA THESAURUS HIERARCHICAL UPDATE

|               |                              |                     |                                 |
|---------------|------------------------------|---------------------|---------------------------------|
| UF            | ROBOT MOTION                 | TRAJECTORY PLANNING | IGNEOUS ROCKS                   |
| RT            | DYNAMIC CONTROL              | VOICE CONTROL       | INLIERS (LANDFORMS)             |
| %             | DYNAMICS                     |                     | REGOLITH                        |
|               | END EFFECTORS                |                     | ROCKS                           |
|               | INVERSE KINEMATICS           |                     |                                 |
|               | MANIPULATORS                 | 3404 4001           | ROCK MECHANICS                  |
|               | ROBOT ARMS                   | RT                  | 1305 1306                       |
|               | ROBOT CONTROL                |                     | RT                              |
|               | ROBOTICS                     |                     | FRACTURE MECHANICS              |
|               | TELEROBOTICS                 |                     | GEOLOGY                         |
|               | TRAJECTORY PLANNING          |                     | ROCKS                           |
|               |                              |                     | SOIL MECHANICS                  |
|               |                              |                     | STRUCTURAL PROPERTIES (GEOLOGY) |
| ROBOT FINGERS |                              |                     |                                 |
| USE           | END EFFECTORS                |                     | ROCK SALT                       |
|               |                              |                     | USE                             |
| ROBOT HANDS   |                              |                     | HALITES                         |
| USE           | END EFFECTORS                |                     |                                 |
| ROBOT MOTION  |                              |                     | ROCKET BOOSTERS                 |
| USE           | ROBOT DYNAMICS               |                     | USE                             |
|               |                              |                     | BOOSTER ROCKET ENGINES          |
| ROBOT SENSORS |                              |                     |                                 |
| 1409 1504     |                              |                     | ROCKET CATAPULTS                |
| GS            | #ROBOT SENSORS               |                     | 1102                            |
|               | . TACTILE SENSORS (ROBOTICS) |                     | 1104 3102                       |
|               | . TORQUE SENSORS (ROBOTICS)  |                     | GS                              |
| RT            | COMPUTER VISION              |                     | LAUNCHERS                       |
|               | ROBOTICS                     |                     | . CATAPULTS                     |
| ROBOTS        |                              |                     | . #ROCKET CATAPULTS             |
| %             | SENSORS                      |                     | . ROCKET LAUNCHERS              |
|               |                              |                     | . #ROCKET CATAPULTS             |
|               |                              |                     | RT                              |
|               |                              |                     | GUN LAUNCHERS                   |
|               |                              |                     | LAUNCH VEHICLES                 |
|               |                              |                     | LAUNCHING SITES                 |
|               |                              |                     | MISSILES                        |
|               |                              |                     | %                               |
|               |                              |                     | ROCKETS                         |
| ROBOTICS      |                              |                     |                                 |
| 1504 4001     |                              |                     | ROCKET CHAMBERS                 |
| GS            | #ROBOTICS                    |                     | USE                             |
|               | . TELEROBOTICS               |                     | THRUST CHAMBERS                 |
| RT            | ARTIFICIAL INTELLIGENCE      |                     |                                 |
|               | AUTOMATA THEORY              |                     | ROCKET ENGINE CASES             |
|               | AUTOMATIC CONTROL            |                     | 1507                            |
| %             | AUTOMATION                   |                     | 2806 3203                       |
|               | COMPUTER AIDED DESIGN        |                     | UF                              |
|               | COMPUTER AIDED MANUFACTURING |                     | MISSILE ENGINE CASES            |
|               | COMPUTER AIDED MAPPING       |                     | ROCKET MOTOR CASES              |
|               | COMPUTER VISION              |                     | GS                              |
|               | END EFFECTORS                |                     | CASES (CONTAINERS)              |
|               | INVERSE KINEMATICS           |                     | #ROCKET ENGINE CASES            |
|               | MAN MACHINE SYSTEMS          |                     | BONDED JOINTS                   |
|               | MANIPULATORS                 |                     | RT                              |
|               | POSITION SENSING             |                     | MISSILE BODIES                  |
|               | ROBOT ARMS                   |                     | ORTHOTROPIC CYLINDERS           |
|               | ROBOT CONTROL                |                     | PERFORATED SHELLS               |
|               | ROBOT DYNAMICS               |                     | SHELLS (STRUCTURAL FORMS)       |
|               | ROBOT SENSORS                |                     | THRUST CHAMBERS                 |
|               | ROBOTS                       |                     |                                 |
|               | TASK PLANNING (ROBOTICS)     |                     | ROCKET ENGINE CONTROL           |
|               | TELEOPERATORS                |                     | 2807                            |
|               |                              |                     | 2808                            |
|               |                              |                     | GS                              |
|               |                              |                     | ENGINE CONTROL                  |
|               |                              |                     | #ROCKET ENGINE CONTROL          |
|               |                              |                     | RT                              |
|               |                              |                     | ATTITUDE CONTROL                |
|               |                              |                     | AUTOMATIC CONTROL               |
|               |                              |                     | %                               |
|               |                              |                     | CONTROL                         |

# NASA THESAURUS HIERARCHICAL UPDATE

DIRECTIONAL CONTROL  
 FLIGHT CONTROL  
 FUEL CONTROL  
 HEUS ROCKET ENGINES  
 MISSILE CONTROL  
 REMOTE CONTROL  
 SERVOCNTRL  
 SPACECRAFT CONTROL  
 THRUST CONTROL

ROCKET ENGINE DESIGN  
 2808 3404  
 GS ENGINE DESIGN  
 #ROCKET ENGINE DESIGN  
 RT COLD FLOW TESTS  
 % DESIGN  
 ENGINE TESTS  
 PREFIRING TESTS  
 ROVER PROJECT

ROCKET ENGINE NOISE  
 2808 3301  
 GS ELASTIC WAVES  
 .SOUND WAVES  
 ..NOISE (SOUND)  
 ...ENGINE NOISE  
 ...#ROCKET ENGINE NOISE  
 RT MUFFLERS

ROCKET ENGINE 9KS-11000  
 2808  
 GS ENGINES  
 .ROCKET ENGINES  
 ..BOOSTER ROCKET ENGINES  
 ...#ROCKET ENGINE 9KS-11000

ROCKET ENGINES  
 2808  
 UF INTERPLANETARY PROPULSION  
 GS ENGINES  
 #ROCKET ENGINES  
 ..BOOSTER ROCKET ENGINES  
 ...AJ-10 ENGINE  
 ...ALGOL ENGINE  
 ...APOGEE BOOST MOTORS  
 ...H-1 ENGINE  
 ...LR-87-AJ-5 ENGINE  
 ...M-1 ENGINE  
 ...M-55 ENGINE  
 ...MA-2 ENGINE  
 ...MA-3 ENGINE  
 ...MA-5 ENGINE  
 ...NIKE BOOSTER ROCKET ENGINES  
 ...P-1 ENGINE  
 ...ROCKET ENGINE 9KS-11000

...SPACE SHUTTLE BOOSTERS  
 ...ADVANCED SOLID ROCKET MOTOR  
 (STS)  
 ...X-405 ENGINE  
 ...DUCTED ROCKET ENGINES  
 ...ELECTRIC ROCKET ENGINES  
 ...ELECTROSTATIC ENGINES  
 ...ELECTROTHERMAL ENGINES  
 ...ARC JET ENGINES  
 ...RESISTOJET ENGINES  
 ...ION ENGINES  
 ...CESIUM ENGINES  
 ...MERCURY ION ENGINES  
 ...RIT ENGINES  
 ...HEUS ROCKET ENGINES  
 ...HOT WATER ROCKET ENGINES  
 ...HYBRID PROPELLANT ROCKET ENGINES  
 ...LITHERGOL ROCKET ENGINES  
 ...LIQUID PROPELLANT ROCKET ENGINES  
 ...AJ-10 ENGINE  
 ...F-1 ROCKET ENGINE  
 ...H-1 ENGINE  
 ...HYDRAZINE ENGINES  
 ...HYDROGEN OXYGEN ENGINES  
 ...J-2 ENGINE  
 ...M-1 ENGINE  
 ...RL-10-A-1 ENGINE  
 ...RL-10-A-3 ENGINE  
 ...LIQUID AIR CYCLE ENGINES  
 ...LR-62-RM-2 ENGINE  
 ...LR-87-AJ-5 ENGINE  
 ...LR-91-AJ-5 ENGINE  
 ...LR-99 ENGINE  
 ...MA-2 ENGINE  
 ...MA-3 ENGINE  
 ...MA-5 ENGINE  
 ...OXYGEN-HYDROCARBON ROCKET  
 ENGINES  
 ...RL-10 ENGINES  
 ...RL-10-A-1 ENGINE  
 ...RL-10-A-3 ENGINE  
 ...SPACE SHUTTLE MAIN ENGINE  
 ...X-405 ENGINE  
 ...XLR-99 ENGINE  
 ...YLR-91-AJ-1 ENGINE  
 ...M-100 ENGINE  
 ...MICROCKET ENGINES  
 ...ORBIT MANEUVERING ENGINE (SPACE  
 SHUTTLE)  
 ...NOZZLELESS ROCKET ENGINES  
 ...NUCLEAR ENGINE FOR ROCKET  
 VEHICLES  
 ...NUCLEAR RAMJET ENGINES  
 ...NUCLEAR ROCKET ENGINES  
 ...NUCLEAR LIGHTBULB ENGINES

...RESTARTABLE ROCKET ENGINES  
 ...RETROCKET ENGINES  
 ...BE-3 ENGINE  
 ...REUSABLE ROCKET ENGINES  
 ...SOLID PROPELLANT ROCKET ENGINES  
 ...ALGOL ENGINE  
 ...APOGEE BOOST MOTORS  
 ...ASROC ENGINE  
 ...HERCULES ENGINE  
 ...M-46 ENGINE  
 ...M-55 ENGINE  
 ...M-56 ENGINE  
 ...M-57 ENGINE  
 ...NIKE BOOSTER ROCKET ENGINES  
 ...P-1 ENGINE  
 ...SL-3 ROCKET ENGINE  
 ...SPACE SHUTTLE BOOSTERS  
 ...ADVANCED SOLID ROCKET MOTOR  
 (STS)  
 ...SYNCOM APOGEE ENGINES  
 ...TU-121 ENGINE  
 ...TX-77 ENGINE  
 ...TX-354 ENGINE  
 ...X-248 ENGINE  
 ...X-254 ENGINE  
 ...X-258 ENGINES  
 ...X-258-B1 ENGINE  
 ...X-259 ENGINE  
 ...XM-33 ENGINE  
 ...SUSTAINER ROCKET ENGINES  
 ...TURBOCKET ENGINES  
 ...ULLAGE ROCKET ENGINES  
 ...UPPER STAGE ROCKET ENGINES  
 ...VERNIER ENGINES  
 ...SYNCOM APOGEE ENGINES  
 AIRCRAFT ENGINES  
 AXIAL MODES  
 BURNING TIME  
 DUMP COMBUSTORS  
 EJECTORS  
 EXHAUST NOZZLES  
 EXPENDABLE STAGES (SPACECRAFT)  
 HEAVY LIFT LAUNCH VEHICLES  
 HYBRID PROPULSION  
 IGNITION SYSTEMS  
 INTERNAL COMBUSTION ENGINES  
 JET ENGINES  
 JET PROPULSION  
 LASER PROPULSION  
 LAUNCH VEHICLES  
 LUNAR MODULE ASCENT STAGE  
 MAGNETOPLASMA DYNAMICS  
 MATTER-ANTIMATTER PROPULSION  
 MISSILE CONFIGURATIONS  
 MISSILES

RT

|                                 |                          |                         |                              |
|---------------------------------|--------------------------|-------------------------|------------------------------|
| MULTISTAGE ROCKET VEHICLES      | VERTICAL FLIGHT          | GS                      | #ROCKET NOZZLES              |
| NEGATIVE MATTER PROPULSION      |                          |                         | .DUAL THRUST NOZZLES         |
| POST BOOST PROPULSION SYSTEM    | ROCKET LAUNCHERS         | RT                      | ANNUAL NOZZLES               |
| % PROPELLANT ACTUATED DEVICES   | 1104 3103 3106           |                         | CARBON-PHENOLIC COMPOSITES   |
| PROPELLANT EXPLOSIONS           | GS                       |                         | CONICAL NOZZLES              |
| REFRATORIES                     | #ROCKET LAUNCHERS        |                         | CONVERGENT-DIVERGENT NOZZLES |
| REUSABLE LAUNCH VEHICLES        | .ROCKET CATAPULTS        |                         | DIVERGENT NOZZLES            |
| % RIFT (REACTOR IN FLIGHT TEST) | RT                       |                         | HYPERSONIC NOZZLES           |
| ROCKETS                         | GROUND SUPPORT EQUIPMENT |                         | NOZZLE INSERTS               |
| SINGLE STAGE ROCKET VEHICLES    | GUN LAUNCHERS            |                         | NOZZLELESS ROCKET ENGINES    |
| SOLID ROCKET PROPELLANTS        | LAUNCH VEHICLES          |                         | % NOZZLES                    |
| SPACECRAFT COMPONENTS           | LAUNCHING                |                         | PLUG NOZZLES                 |
| SPACECRAFT PROPULSION           | LAUNCHING SITES          |                         | SKIRTS                       |
| SPACECRAFT STRUCTURES           | MISSILE LAUNCHERS        |                         | SPIKE NOZZLES                |
| THRUST                          | % ROCKETS                |                         | SUPERSONIC NOZZLES           |
| THRUST VECTOR CONTROL           | ROCKDOONS                |                         |                              |
| THRUST-WEIGHT RATIO             | SEA LAUNCHING            |                         |                              |
| % THRUSTORS                     |                          |                         |                              |
| ROCKET EXHAUST                  | ROCKET LAUNCHING         | ROCKET OXIDIZERS        |                              |
| 1203 2808                       | 1104 3103 3106           | 2702 2804 2809 3301     |                              |
| GS                              | UF BLASTOFF              | UF PROPELLANT OXIDIZERS |                              |
| #ROCKET EXHAUST                 | GS                       | GS OXIDIZERS            |                              |
| BASE HEATING                    | #ROCKET LAUNCHING        | #ROCKET OXIDIZERS       |                              |
| COMBUSTION PRODUCTS             | .LIFTOFF (LAUNCHING)     | .FLOX                   |                              |
| EXHAUST CLOUDS                  | .LUNAR LAUNCH            | .TAGN                   |                              |
| EXHAUST GASES                   | .ORBITAL LAUNCHING       | CRYOGENIC FLUIDS        |                              |
| EXHAUST SYSTEMS                 | EXHAUST CLOUDS           | DOMINO PROPELLANTS      |                              |
| JET EXHAUST                     | LAUNCH VEHICLES          | HIGH ENERGY OXIDIZERS   |                              |
|                                 | LAUNCH WINDOWS           | HYDROGEN PEROXIDE       |                              |
|                                 | LAUNCHERS                | LIQUID OXIDIZERS        |                              |
|                                 | SPACECRAFT LAUNCHING     | LIQUID OXYGEN           |                              |
|                                 |                          | NITROGEN TETROXIDE      |                              |
|                                 |                          | NITRONIUM PERCHLORATE   |                              |
|                                 |                          | TATB                    |                              |
|                                 |                          | TETRAFLUOROHYDRAZINE    |                              |
| ROCKET FIRING                   |                          |                         |                              |
| 2808 3301                       | ROCKET LININGS           | ROCKET PLANES           |                              |
| GS                              | 0602 1802 2806           | 0201 3106               |                              |
| #ROCKET FIRING                  | GS                       | GS                      | ROCKET VEHICLES              |
| .RETROFIRING                    | #ROCKET LININGS          | #ROCKET PLANES          |                              |
| BURNING TIME                    | RT BONDED JOINTS         | .X-1 AIRCRAFT           |                              |
| DETONATION                      | ENGINE PARTS             | .X-2 AIRCRAFT           |                              |
| LIFTOFF (LAUNCHING)             | REFRATORIES              | .X-15 AIRCRAFT          |                              |
| STATIC FIRING                   |                          | AEROSPACE PLANES        |                              |
| TEST FIRING                     | ROCKET MOTOR CASES       | % AIRCRAFT              |                              |
|                                 | USE ROCKET ENGINE CASES  | BOOSTGLIDE VEHICLES     |                              |
|                                 |                          | RESEARCH AIRCRAFT       |                              |
| ROCKET FLIGHT                   |                          |                         |                              |
| 0101 2807 3006 3106             | ROCKET NOSE CONES        | ROCKET PROPELLANT TANKS |                              |
| RT                              | 2806                     | USE PROPELLANT TANKS    |                              |
| % CLIMBING FLIGHT               | GS                       |                         |                              |
| COASTING FLIGHT                 | CONES                    | ROCKET PROPELLANTS      |                              |
| % FLIGHT                        | .NOSE CONES              | 2702                    |                              |
| FLIGHT PATHS                    | .#ROCKET NOSE CONES      | UF                      | MULTIPROPELLANTS             |
| HORIZONTAL FLIGHT               | FOREBODIES               | GS                      | PROPELLANTS                  |
| HYPERSONIC FLIGHT               | .NOSES (FOREBODIES)      |                         | #ROCKET PROPELLANTS          |
| METEOROLOGICAL FLIGHT           | .NOSE CONES              |                         | .GASEOUS ROCKET PROPELLANTS  |
| SPACE FLIGHT                    | .#ROCKET NOSE CONES      |                         |                              |
| SUBORBITAL FLIGHT               | RT ABLATIVE NOSE CONES   |                         |                              |
| SUPERSONIC FLIGHT               |                          |                         |                              |
| TRAJECTORIES                    | ROCKET NOZZLES           |                         |                              |
| TRANSONIC FLIGHT                | 2806 2808                |                         |                              |

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|                            |                                   |                               |                                  |
|----------------------------|-----------------------------------|-------------------------------|----------------------------------|
| RT                         | ..LIQUID ROCKET PROPELLANTS       | ROCKET TEST FACILITIES        | ..BLUE SCOUT ROCKET VEHICLE      |
|                            | ...CRYOGENIC ROCKET PROPELLANTS   | 1108 3106                     | ..DIAMANT LAUNCH VEHICLE         |
|                            | ...GELLED ROCKET PROPELLANTS      | GS TEST FACILITIES            | ..ELDO LAUNCH VEHICLE            |
|                            | ...HYPERGOLIC ROCKET PROPELLANTS  | #ROCKET TEST FACILITIES       | ..EXOS SOUNDING ROCKET           |
|                            | ...MONOPROPELLANTS                | RT ENGINE TESTS               | ..JAGUAR ROCKET VEHICLE          |
|                            | ....AEROZINE                      | TEST FIRING                   | ..JAVELIN ROCKET VEHICLE         |
|                            | ...RP-1 ROCKET PROPELLANTS        | TEST RANGES                   | ..JUNO LAUNCH VEHICLES           |
|                            | ...SLURRY PROPELLANTS             | TEST STANDS                   | ...JUNO 1 LAUNCH VEHICLE         |
|                            | ...SLUSH HYDROGEN                 |                               | ...JUNO 2 LAUNCH VEHICLE         |
|                            | ..NITRAMINE PROPELLANTS           | ROCKET THRUST                 | ..JUPITER C ROCKET VEHICLE       |
|                            | ...SOLID ROCKET PROPELLANTS       | O101 2308 3106                | ..KAPPA ROCKET VEHICLES          |
|                            | ...DOUBLE BASE ROCKET PROPELLANTS | GS THRUST                     | ...KAPPA 8 ROCKET VEHICLE        |
|                            | ...METAL PROPELLANTS              | #ROCKET THRUST                | ...KAPPA 9 ROCKET VEHICLE        |
|                            | ..TAGN                            | ..RETROTHRUST                 | ..LAMBDA ROCKET VEHICLES         |
|                            | ..TATB                            | RT HIGH THRUST                | ..LITTLE JOE 2 LAUNCH VEHICLE    |
| RT                         | ASCENT PROPULSION SYSTEMS         | JET THRUST                    | ..NIKE ROCKET VEHICLES           |
|                            | AUXILIARY PROPULSION              | LIFTOFF (LAUNCHING)           | ...NIKE-APACHE ROCKET VEHICLE    |
|                            | FUELS                             | LOW THRUST                    | ...NIKE-CAJUN ROCKET VEHICLE     |
|                            | HYDROCARBON FUELS                 | LOW THRUST PROPULSION         | ...NIKE-HYDAC ROCKET VEHICLE     |
|                            | MISSILES                          | MICROTHRUST                   | ...NIKE-IRQUOIS ROCKET VEHICLE   |
|                            | PROPELLANT BINDERS                | PROPULSION SYSTEM PERFORMANCE | ...NIKE-JAVELIN ROCKET VEHICLE   |
|                            | PROPELLANT STORAGE                | SPECIFIC IMPULSE              | ...NIKE-TOMAHAWK ROCKET VEHICLE  |
|                            | PROPULSION                        | STATIC THRUST                 | ..NOVA LAUNCH VEHICLES           |
|                            | SOLID PROPELLANTS                 | THRUST LOADS                  | ..PEGASUS AIR-LAUNCHED BOOSTER   |
|                            | SPECIFIC IMPULSE                  | THRUST TERMINATION            | ..PHOENIX SOUNDING ROCKET        |
|                            | STORABLE PROPELLANTS              | VARIABLE THRUST               | ..RAM B LAUNCH VEHICLE           |
|                            | THRUST                            |                               | ..RUBIS ROCKET VEHICLE           |
|                            | TORPEDO ENGINES                   | ROCKET VEHICLES               | ..SATURN LAUNCH VEHICLES         |
|                            |                                   | 3106 3110                     | ...SATURN D LAUNCH VEHICLE       |
|                            |                                   | GS #ROCKET VEHICLES           | ...SATURN 1 LAUNCH VEHICLES      |
| ROCKET PROPELLED SLEDS     |                                   |                               | ...SATURN 1 SA-1 LAUNCH VEHICLE  |
| 2808 3404                  |                                   |                               | ...SATURN 1 SA-2 LAUNCH VEHICLE  |
| GS SURFACE VEHICLES        |                                   |                               | ...SATURN 1 SA-3 LAUNCH VEHICLE  |
| ..SLEDS                    |                                   |                               | ...SATURN 1 SA-4 LAUNCH VEHICLE  |
| RT #ROCKET PROPELLED SLEDS |                                   |                               | ...SATURN 1 SA-5 LAUNCH VEHICLE  |
| JAVELIN ROCKET VEHICLE     |                                   |                               | ...SATURN 1 SA-6 LAUNCH VEHICLE  |
| % TEST EQUIPMENT           |                                   |                               | ...SATURN 1 SA-7 LAUNCH VEHICLE  |
|                            |                                   |                               | ...SATURN 1 SA-8 LAUNCH VEHICLE  |
|                            |                                   |                               | ...SATURN 1 SA-9 LAUNCH VEHICLE  |
|                            |                                   |                               | ...SATURN 1 SA-10 LAUNCH VEHICLE |
|                            |                                   |                               | ...SATURN 1B LAUNCH VEHICLES     |
|                            |                                   |                               | ...SATURN 2 LAUNCH VEHICLES      |
|                            |                                   |                               | ...SATURN 5 LAUNCH VEHICLES      |
|                            |                                   |                               | ..SCOUT LAUNCH VEHICLE           |
|                            |                                   |                               | ..SKYLARK ROCKET VEHICLE         |
|                            |                                   |                               | ..THOR LAUNCH VEHICLES           |
|                            |                                   |                               | ...THOR ABLE ROCKET VEHICLE      |
|                            |                                   |                               | ...THOR AGENA LAUNCH VEHICLE     |
|                            |                                   |                               | ...THOR DELTA LAUNCH VEHICLE     |
|                            |                                   |                               | ..TITAN LAUNCH VEHICLES          |
|                            |                                   |                               | ...TITAN 3 LAUNCH VEHICLE        |
|                            |                                   |                               | ...TITAN 4 LAUNCH VEHICLE        |
|                            |                                   |                               | ..VANGUARD 2 LAUNCH VEHICLE      |
|                            |                                   |                               | ..VEGA LAUNCH VEHICLE            |
|                            |                                   |                               | ..WASP SOUNDING ROCKET           |
| ROCKET SONDES              |                                   |                               |                                  |
| USE SOUNDING ROCKETS       |                                   |                               |                                  |
| ROCKET SOUNDING            |                                   |                               |                                  |
| 2003 3004 3007 3108        |                                   |                               |                                  |
| GS SOUNDING                |                                   |                               |                                  |
| RT #ROCKET SOUNDING        |                                   |                               |                                  |
| ACOUSTIC SOUNDING          |                                   |                               |                                  |
| ATMOSPHERIC SOUNDING       |                                   |                               |                                  |
| BARIUM ION CLOUDS          |                                   |                               |                                  |
| IN SITU MEASUREMENT        |                                   |                               |                                  |
| IONOSPHERIC SOUNDING       |                                   |                               |                                  |
| JUDI-DART ROCKET           |                                   |                               |                                  |
| MICROWAVE SOUNDING         |                                   |                               |                                  |
| SATELLITE SOUNDING         |                                   |                               |                                  |
| SOUNDING ROCKETS           |                                   |                               |                                  |

|                                     |                                 |                                    |  |
|-------------------------------------|---------------------------------|------------------------------------|--|
| ..PAYLOAD ASSIST MODULE             | ..KAPPA ROCKET VEHICLES         | PHOTOGRAPHY                        |  |
| ..ROCKET PLANES                     | ...KAPPA 8 ROCKET VEHICLE       | #ROCKET-BORNE PHOTOGRAPHY          |  |
| ..X-1 AIRCRAFT                      | ...KAPPA 9 ROCKET VEHICLE       | RT AERIAL PHOTOGRAPHY              |  |
| ..X-2 AIRCRAFT                      | ..LAMBDA ROCKET VEHICLES        | ASTRONOMICAL PHOTOGRAPHY           |  |
| ..X-15 AIRCRAFT                     | ..LOKI ROCKET VEHICLE           | BLACK AND WHITE PHOTOGRAPHY        |  |
| ..SATURN STAGES                     | ..PETREL SOUNDING ROCKET        | PHOTOMAPPING                       |  |
| ..SATURN S-1 STAGE                  | ..PHOENIX SOUNDING ROCKET       | SATELLITE-BORNE PHOTOGRAPHY        |  |
| ..SATURN S-1B STAGE                 | ..SKUA ROCKET VEHICLES          | SPACEBORNE PHOTOGRAPHY             |  |
| ..SATURN S-1C STAGE                 | ..SKYLARK ROCKET VEHICLE        |                                    |  |
| ..SATURN S-2 STAGE                  | ..VENUS FLY TRAP ROCKET VEHICLE |                                    |  |
| ..SATURN S-4 STAGE                  | ..VERONIQUE ROCKET VEHICLES     | % ROCKETS                          |  |
| ..SATURN S-4B STAGE                 | ..VERTICAL 8 ROCKET             | 3106 3110                          |  |
| ..SINGLE STAGE ROCKET VEHICLES      | ..WASP SOUNDING ROCKET          | SN (USE OF A MORE SPECIFIC TERM IS |  |
| ..AGENA ROCKET VEHICLES             | ..STANDARD LAUNCH VEHICLES      | RECOMMENDED--CONSULT THE TERMS     |  |
| ...AGENA A ROCKET VEHICLE           | ..ATLAS SLV-3 LAUNCH VEHICLE    | LISTED BELOW)                      |  |
| ...AGENA B ROCKET VEHICLE           | ..STANDARD LAUNCH VEHICLE 5     | RT AIR SLEW MISSILES               |  |
| ...AGENA C ROCKET VEHICLE           | ..SURFACE TO SURFACE ROCKETS    | AMMUNITION                         |  |
| ...AGENA D ROCKET VEHICLE           | ..HONEST JOHN ROCKET VEHICLE    | ESCAPE ROCKETS                     |  |
| ..ARCAS ROCKET VEHICLES             | ..LITTLE JOHN ROCKET VEHICLE    | HEAVY LIFT LAUNCH VEHICLES         |  |
| ..BLACK BRANT SOUNDING ROCKETS      | ..THORAD LAUNCH VEHICLES        | INCENDIARY AMMUNITION              |  |
| ...BLACK BRANT 1 SOUNDING ROCKET    | ..THOR ABLE ROCKET VEHICLE      | LAUNCH VEHICLES                    |  |
| ...BLACK BRANT 2 SOUNDING ROCKET    | ..THOR AGENA LAUNCH VEHICLE     | MISSILES                           |  |
| ...BLACK BRANT 3 SOUNDING ROCKET    | ..THOR DELTA LAUNCH VEHICLE     | NUCLEAR RAMJET ENGINES             |  |
| ...BLACK BRANT 4 SOUNDING ROCKET    | ..TITAN CENTAUR LAUNCH VEHICLE  | NUCLEAR ROCKET ENGINES             |  |
| ...BLACK BRANT 5 SOUNDING ROCKET    | ..ACQUSTIC SOUNDING             | NUCLEAR WEAPONS                    |  |
| ..BLACK KNIGHT ROCKET VEHICLE       | % BALLISTIC VEHICLES            | PATRIOT MISSILE                    |  |
| ..DORNIER PARAGLIDER ROCKET VEHICLE | % FLIGHT VEHICLES               | PETREL SOUNDING ROCKET             |  |
| ..GENIE ROCKET VEHICLE              | HEUS ROCKET ENGINES             | PYROTECHNICS                       |  |
| ..HONEST JOHN ROCKET VEHICLE        | LAUNCH VEHICLES                 | REENTRY                            |  |
| ..HYLA-STAR ROCKET VEHICLE          | MISSILE CONFIGURATIONS          | REENTRY VEHICLES                   |  |
| ..LITTLE JOHN ROCKET VEHICLE        | MULTIENGINE VEHICLES            | ROCKET CATAPULTS                   |  |
| ..LOKI ROCKET VEHICLE               | % ROCKETS                       | ROCKET ENGINES                     |  |
| ..NOMAD LAUNCH VEHICLE              | SPACE PROCESSING APPLICATIONS   | ROCKET LAUNCHERS                   |  |
| ..VERONIQUE ROCKET VEHICLES         | ROCKET                          | ROCKET VEHICLES                    |  |
| ..ZUNI ROCKET VEHICLE               | STAGE SEPARATION                | ROCKOONS                           |  |
| ..SOUNDING ROCKETS                  | TEST VEHICLES                   | SPACE FLIGHT                       |  |
| ..AEROBEE ROCKET VEHICLE            | TRAILBLAZER 1 REENTRY VEHICLE   | SURFACE TO AIR MISSILES            |  |
| ..ANTARES ROCKET VEHICLE            | TRAILBLAZER 2 REENTRY VEHICLE   | SURFACE TO SURFACE MISSILES        |  |
| ..APACHE ROCKET VEHICLE             | % VEHICLES                      | SURFACE TO SURFACE ROCKETS         |  |
| ..ARCAS ROCKET VEHICLES             | % WINGED VEHICLES               | TORPEDOES                          |  |
| ..ARIES SOUNDING ROCKET             | X-17 REENTRY VEHICLE            | VERTICAL 8 ROCKET                  |  |
| ..ASTROBEE ROCKET VEHICLES          |                                 | WARHEADS                           |  |
| ...ASTROBEE 1500 ROCKET VEHICLE     | ROCKET-BORNE INSTRUMENTS        | WEAPON SYSTEMS                     |  |
| ..BLACK BRANT SOUNDING ROCKETS      | 1410 2102 2806 2807 3106        | WEAPONS DELIVERY                   |  |
| ...BLACK BRANT 1 SOUNDING ROCKET    | RT CONTROLLERS                  |                                    |  |
| ...BLACK BRANT 2 SOUNDING ROCKET    | FLIGHT TEST INSTRUMENTS         | ROCKOONS                           |  |
| ...BLACK BRANT 3 SOUNDING ROCKET    | % INSTRUMENTS                   | O205 2809 3106 3108                |  |
| ...BLACK BRANT 4 SOUNDING ROCKET    | MEASURING INSTRUMENTS           | RT HIGH ALTITUDE BALLOONS          |  |
| ...BLACK BRANT 5 SOUNDING ROCKET    | METEOROLOGICAL INSTRUMENTS      | METEOROLOGICAL BALLOONS            |  |
| ..CAJUN ROCKET VEHICLE              | POSITION INDICATORS             | ROBIN BALLOONS                     |  |
| ..DORNIER PARAGLIDER ROCKET VEHICLE |                                 | ROCKET LAUNCHERS                   |  |
| ..EXOS SOUNDING ROCKET              | ROCKET-BORNE PHOTOGRAPHY        | % ROCKETS                          |  |
| ..JAGUAR ROCKET VEHICLE             | 1407 3009 3106                  | SKYHOOK BALLOONS                   |  |
| ..JUUDI-DART ROCKET                 | GS IMAGERY                      |                                    |  |
|                                     | #ROCKET-BORNE PHOTOGRAPHY       | ROCKS                              |  |
|                                     |                                 | 1305 1306 3009                     |  |

| UF | STONES (ROCKS)          |
|----|-------------------------|
| GS | #ROCKS                  |
|    | .ANDESITE               |
|    | .ATAXITE                |
|    | .BEDROCK                |
|    | .BALTIC SHIELD (EUROPE) |
|    | .BATHOLITHS             |
|    | .BRECCIA                |
|    | .GNEISS                 |
|    | .IGNEOUS ROCKS          |
|    | .ANORTHOSITE            |
|    | .BASALT                 |
|    | .DIORITE                |
|    | .DUNITE                 |
|    | .ECLOGITE               |
|    | .FELSITE                |
|    | .GABBRO                 |
|    | .GRANITE                |
|    | .OBSIDIAN               |
|    | .MOLDAVITE              |
|    | .PERIDOTITE             |
|    | .PUMICE                 |
|    | .RHOLITE                |
|    | .SYENITE                |
|    | .TRACHYTE               |
|    | .LUNAR ROCKS            |
|    | .KREEP                  |
|    | .METAMORPHIC ROCKS      |
|    | .QUARZITE               |
|    | .REGOLITH               |
|    | .SCHIST                 |
|    | .SEDIMENTARY ROCKS      |
|    | .CARBONACEOUS ROCKS     |
|    | .COAL                   |
|    | .ANTHRACITE             |
|    | .LIGNITE                |
|    | .LIMESTONE              |
|    | .SANDSTONES             |
|    | .SHALES                 |
|    | .SHATTER CONES          |
|    | AGGREGATES              |
|    | BAUXITE                 |
|    | BOREHOLES               |
|    | CLAYS                   |
|    | CONTACTS (GEOLOGY)      |
|    | CROSSBEDDING (GEOLOGY)  |
|    | DIRT                    |
|    | DOLOMITE (MINERAL)      |
|    | EARTH RESOURCES         |
|    | EFFUSIVES               |
|    | ENSTATITE               |
|    | FOLDS (GEOLOGY)         |
|    | FORMATIONS              |
|    | GEOLOGY                 |
|    | GYPSUM                  |
| RT |                         |

1229

ROLLERS  
 1504  
 RT CONVEYORS  
 CYLINDRICAL BODIES  
 DISPENSERS  
 DISTRIBUTORS  
 IDLERS  
 PLATENS  
 PULLEYS  
 ROLL  
 TIRES  
 VEHICLE WHEELS  
 WHEELS

ROMANIA  
 1305  
 UF RUMANIA  
 GS NATIONS  
 RT #ROMANIA  
 CENTRAL EUROPE  
 EUROPE

ROOTS OF EQUATIONS  
 WING ROOTS

ROOTS OF EQUATIONS  
 1902  
 UF ZERO CROSSINGS  
 RT EIGENVALUES  
 % EQUATIONS  
 EXISTENCE THEOREMS  
 MATRICES (MATHEMATICS)  
 NEWTON METHODS  
 NONLINEAR EQUATIONS  
 POLYNOMIALS  
 % ROOTS

RORSCHACH TESTS  
 0408 0410  
 GS PSYCHOLOGICAL TESTS  
 #RORSCHACH TESTS  
 RT MENTAL HEALTH  
 PSYCHOLOGY  
 % TESTS

ROSAT MISSION  
 3110 2903 3001  
 UF ROENTGEN SATELLITE  
 GS ARTIFICIAL SATELLITES  
 #ROSAT MISSION  
 OBSERVATORIES  
 .ASTRONOMICAL OBSERVATORIES  
 .#ROSAT MISSION  
 RT ASTRONOMICAL SATELLITES  
 INTERNATIONAL COOPERATION  
 SPACEBORNE ASTRONOMY  
 SPACEBORNE TELESCOPES  
 X RAY ASTRONOMY  
 X RAY SOURCES  
 X RAY TELESCOPES

ROSETTE SHAPES  
 3203  
 GS SHAPES  
 #ROSETTE SHAPES  
 RT ANTENNA RADIATION PATTERNS  
 CRYSTALLITES  
 SPHERULITES  
 STRAIN GAGES

ROSHKO PREDICTION  
 1202 1203 1204  
 GS PREDICTIONS  
 #ROSHKO PREDICTION  
 RT BLUFF BODIES  
 LAMINAR FLOW  
 OSEEN APPROXIMATION

ROMANIA  
 1305  
 UF RUMANIA  
 GS NATIONS  
 RT #ROMANIA  
 CENTRAL EUROPE  
 EUROPE

RONCHI TEST  
 1411  
 GS INTERFEROMETRY  
 #RONCHI TEST  
 RT ELECTROMAGNETIC RADIATION  
 ETALONS  
 GRATINGS (SPECTRA)  
 INTERFEROMETERS  
 MEASURING INSTRUMENTS  
 OPTICAL MEASUREMENT

ROOFS  
 3202  
 RT BUILDINGS  
 SHEATHS

ROOM TEMPERATURE  
 0603 1408  
 GS TEMPERATURE  
 #ROOM TEMPERATURE  
 RT AMBIENT TEMPERATURE  
 OPERATING TEMPERATURE

ROOMS  
 0405 0701 0803 1101 1104 1106 3404  
 GS #ROOMS  
 .CLEAN ROOMS  
 .DARKROOMS  
 RT COMPARTMENTS  
 ENCLOSURES  
 % LOUNGES

ROOT-MEAN-SQUARE ERRORS  
 1905  
 GS ERRORS  
 #ROOT-MEAN-SQUARE ERRORS  
 RT ERROR ANALYSIS  
 STATISTICAL ANALYSIS

% ROOTS  
 0104 0409 1902  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT PLANT ROOTS  
 RADICALS

ROLLING CONTACT LOADS  
 1504  
 GS LOADS (FORCES)  
 .DYNAMIC LOADS  
 ..CONTACT LOADS  
 ..#ROLLING CONTACT LOADS  
 RT ANTIFRICTION BEARINGS  
 STRESSES  
 STRUCTURAL DESIGN CRITERIA

ROLLING MOMENTS  
 0101 0102 0201  
 GS MOMENTS  
 .STABILITY DERIVATIVES  
 .#ROLLING MOMENTS  
 RT AERODYNAMIC COEFFICIENTS  
 LATERAL STABILITY  
 MOMENTS OF INERTIA  
 PITCHING MOMENTS  
 ROLL  
 TORQUE  
 YAWING MOMENTS

ROLLUP SOLAR ARRAYS  
 USE SOLAR ARRAYS

ROM DEVICES  
 USE READ-ONLY MEMORY DEVICES



# NASA THESAURUS HIERARCHICAL UPDATE

## THREE DIMENSIONAL FLOW

ROSIN

1805 1808

GS GUMS (SUBSTANCES)

#ROSIN

RT ORGANIC MATERIALS

ROSS ICE SHELF

1305

GS REGIONS

.POLAR REGIONS

..ANTARCTIC REGIONS

..#ROSS ICE SHELF

SOUTHERN HEMISPHERE

.ANTARCTIC REGIONS

.#ROSS ICE SHELF

RT MCMURDO SOUND

ROSSBY REGIMES

1202 1203 2003

RT BAROTROPIC FLOW

PLANETARY WAVES

ROSSBY WAVES

USE PLANETARY WAVES

ROTARY DRIVES

USE MECHANICAL DRIVES

ROTARY ENGINES

GS ENGINES

.INTERNAL COMBUSTION ENGINES

.#ROTARY ENGINES

..WANKEL ENGINES

AIRCRAFT ENGINES

AUTOMOBILE ENGINES

PISTON ENGINES

ROTARY GYROSCOPES

O101 0202 1403

GS GYROSCOPES

#ROTARY GYROSCOPES

..FLUID ROTOR GYROSCOPES

GYROSCOPE FLUIDS

GYROSCOPIC STABILITY

ROTATING BODIES

ROTARY STABILITY

O101 0104 0201

UF WHIRL INSTABILITY

GS DYNAMIC CHARACTERISTICS

.DYNAMIC STABILITY

..MOTION STABILITY

..#ROTARY STABILITY

....GYROSCOPIC STABILITY

STABILITY

.DYNAMIC STABILITY

..MOTION STABILITY

..#ROTARY STABILITY

....GYROSCOPIC STABILITY

AIRFOIL OSCILLATIONS

DIRECTIONAL STABILITY

FLOW STABILITY

LATERAL STABILITY

LONGITUDINAL STABILITY

ROTATING BODIES

ROTATION

ROTOR DYNAMICS

RT

ROTARY WING AIRCRAFT

O104 0201 0206

UF ROTORCRAFT

GS V/STOL AIRCRAFT

#ROTARY WING AIRCRAFT

..AUTOGYROS

...AVIAN 2/180 AUTOGIRO

..HELICOPTERS

...ALOUETTE HELICOPTERS

....SA-330 HELICOPTER

....SE-3160 HELICOPTER

...COMPOUND HELICOPTERS

...H-17 HELICOPTER

...LIGHT HELICOPTERS

....OH-4 HELICOPTER

....OH-5 HELICOPTER

....OH-6 HELICOPTER

....OH-58 HELICOPTER

...MILITARY HELICOPTERS

....AH-1G HELICOPTER

....AH-64 HELICOPTER

....BELL 214A HELICOPTER

....BO-105 HELICOPTER

....CH-3 HELICOPTER

....CH-21 HELICOPTER

....CH-34 HELICOPTER

....CH-46 HELICOPTER

....CH-47 HELICOPTER

....CH-54 HELICOPTER

....H-19 HELICOPTER

....H-43 HELICOPTER

....H-53 HELICOPTER

....H-54 HELICOPTER

....H-56 HELICOPTER

....H-60 HELICOPTER

....HC-3 HELICOPTER

....HEAVY LIFT HELICOPTERS

....CH-62 HELICOPTER

....HH-43 HELICOPTER

....OH-4 HELICOPTER

....OH-5 HELICOPTER

....OH-6 HELICOPTER

....OH-13 HELICOPTER

....OH-23 HELICOPTER

....OH-58 HELICOPTER

....P-531 HELICOPTER

....QH-50 HELICOPTER

....S-58 HELICOPTER

....S-61 HELICOPTER

....SA-321 HELICOPTER

....SA-330 HELICOPTER

....SH-3 HELICOPTER

....SH-4 HELICOPTER

....SIKORSKY WHIRLWIND HELICOPTER

....UH-1 HELICOPTER

....UH-2 HELICOPTER

....UH-34 HELICOPTER

....UH-60A HELICOPTER

....UH-61A HELICOPTER

....WESTLAND WHIRLWIND HELICOPTER

....XV-9A AIRCRAFT

...RIGID ROTOR HELICOPTERS

....CH-3 HELICOPTER

....F-28 HELICOPTER

....XH-51 HELICOPTER

...TANDEM ROTOR HELICOPTERS

....CH-46 HELICOPTER

....CH-47 HELICOPTER

....H-25 HELICOPTER

....TH-55 HELICOPTER

..ROTOR SYSTEMS RESEARCH AIRCRAFT

..TILT ROTOR AIRCRAFT

...V-22 AIRCRAFT

...XV-15 AIRCRAFT

RT % AIRCRAFT

AUTOROTATION

COMMERCIAL AIRCRAFT

LIFTING ROTORS

% MILITARY AIRCRAFT

PASSENGER AIRCRAFT

% SHORT TAKEOFF AIRCRAFT

SUBSONIC AIRCRAFT

TRANSPORT AIRCRAFT

VERTICAL TAKEOFF AIRCRAFT

WESER AIRCRAFT

WESTLAND AIRCRAFT

ROTARY WINGS

O104 0201 0202

UF HELICOPTER ROTORS

HINGED ROTOR BLADES

GS AIRFOILS

.WINGS

..#ROTARY WINGS

...CIRCULATION CONTROL ROTORS

|                               |                                     |                     |                               |
|-------------------------------|-------------------------------------|---------------------|-------------------------------|
| ...LIFTING ROTORS             | ...CIRCULATION CONTROL ROTORS       |                     |                               |
| ...BEARINGLESS ROTORS         | ...LIFTING ROTORS                   |                     | ELECTRIC HYBRID VEHICLES      |
| ...RIGID ROTORS               | ...BEARINGLESS ROTORS               |                     | ELECTRIC MOTORS               |
| ...TILTING ROTORS             | ...RIGID ROTORS                     |                     | INDUCTION MOTORS              |
| ...TIP DRIVEN ROTORS          | ...TILTING ROTORS                   |                     | % MACHINERY                   |
| ...X WING ROTORS              | ...TIP DRIVEN ROTORS                |                     | ROTATING GENERATORS           |
| ROTATING BODIES               | ...X WING ROTORS                    |                     | ROTORS                        |
| .ROTORS                       | ...TAIL ROTORS                      |                     | SERVOMOTORS                   |
| .#ROTARY WINGS                | ...HELICOPTER TAIL ROTORS           |                     | STATORS                       |
| ...CIRCULATION CONTROL ROTORS | ...TIP VANES                        |                     |                               |
| ...LIFTING ROTORS             | ..TURBINE WHEELS                    |                     | ROTATING ENVIRONMENTS         |
| ...BEARINGLESS ROTORS         | AXES OF ROTATION                    |                     | O401 O408 O504 O506           |
| ...RIGID ROTORS               | % BODIES                            | RT                  | ENVIRONMENTS                  |
| ...TILTING ROTORS             | PLANETARY ROTATION                  |                     | #ROTATING ENVIRONMENTS        |
| ...TIP DRIVEN ROTORS          | ROCHE LIMIT                         |                     | RT ARTIFICIAL GRAVITY         |
| ...X WING ROTORS              | ROTARY GYROSCOPES                   |                     | BARANY CHAIR                  |
| BLADE TIPS                    | ROTARY STABILITY                    |                     | CORIOLIS EFFECT               |
| BLADE-VORTEX INTERACTION      | ROTATION                            |                     | HIGH GRAVITY ENVIRONMENTS     |
| % BLADES                      | SPINNING UNGUIDED ROCKET TRAJECTORY |                     | LANGLEY COMPLEX COORDINATOR   |
| CONVERTIBLE FAN-SHAFT ENGINES |                                     |                     | SPACECRAFT ENVIRONMENTS       |
| FAN BLADES                    | ROTATING CYLINDERS                  |                     | TUMBLING MOTION               |
| FLAPPING HINGES               | 1202 2308 0102                      |                     |                               |
| FOLDING STRUCTURES            | GS                                  |                     | ROTATING FLUIDS               |
| GROUND RESONANCE              | #ROTATING CYLINDERS                 | 1202 1203           |                               |
| HARMONIC CONTROL              | SYMMETRICAL BODIES                  | GS #ROTATING FLUIDS |                               |
| HELICOPTER PROPELLER DRIVE    | .BODIES OF REVOLUTION               |                     | .ROTATING LIQUIDS             |
| HELICOPTER TAIL ROTORS        | ..CYLINDRICAL BODIES                | RT                  | COUNTER ROTATION              |
| LIFT FANS                     | ..#ROTATING CYLINDERS               | %                   | FLUIDS                        |
| PROPELLER BLADES              | COUETTE FLOW                        |                     | GOERTLER INSTABILITY          |
| ROTOR BLADES                  | CYLINDERS                           | RT                  | KARMAN-BODEWADT FLOW          |
| ROTOR DYNAMICS                | CYLINDRICAL SHELLS                  | %                   | LIQUID SLOSHING               |
| TAIL ROTORS                   | ELASTOHYDRODYNAMICS                 |                     | PLANETARY WAVES               |
| TILT ROTOR RESEARCH AIRCRAFT  | MAGNUS EFFECT                       |                     | SUPERROTATION                 |
| PROGRAM                       | SHAFTS (MACHINE ELEMENTS)           |                     | TAYLOR INSTABILITY            |
| V-22 AIRCRAFT                 | VISCOMETERS                         |                     | TRAPPED VORTICES              |
| WHIRL TOWERS                  | VISCOMETRY                          |                     | TURBULENT FLOW                |
|                               |                                     |                     | VORTEX SHEETS                 |
|                               |                                     |                     | VORTICES                      |
|                               |                                     |                     | WING TIP VORTICES             |
| ROTATING                      | ROTATING DISKS                      |                     |                               |
| USE ROTATION                  | O101 1202 2308                      |                     | ROTATING GENERATORS           |
|                               | GS                                  |                     | O301 1504                     |
| ROTATING BODIES               | DISKS (SHAPES)                      |                     | UF DYNAMOS                    |
| O101 1901 2308 3001           | #ROTATING DISKS                     |                     | ELECTRIC GENERATORS           |
| UF ROTATING VEHICLES          | ROTATING BODIES                     | GS                  | #ROTATING GENERATORS          |
| SOLID ROTATION                | #ROTATING DISKS                     |                     | ..AMPLIDYNES                  |
| GS #ROTATING BODIES           | ACCRETION DISKS                     |                     | ..DYNAMOMETERS                |
| .LUNAR ROTATION               | COUNTER ROTATION                    |                     | ..HOMOPOLAR GENERATORS        |
| .ROTATING CYLINDERS           | KARMAN-BODEWADT FLOW                |                     | ..TURBOGENERATORS             |
| .ROTATING DISKS               | MISTUNING (TURBOMACHINERY)          |                     | ...ASTECS SOLAR TURBOELECTRIC |
| .ROTATING SPHERES             |                                     |                     | GENERATOR                     |
| .ROTORS                       | % ROTATING ELECTRICAL MACHINES      |                     | AC GENERATORS                 |
| ..COMPRESSOR ROTORS           | 1504                                |                     | COMMUTATORS                   |
| ..FLYWHEELS                   | SN                                  | RT                  | DC GENERATORS                 |
| ..IMPELLERS                   | (USE OF A MORE SPECIFIC TERM IS     |                     | ELECTROSTATIC GENERATORS      |
| ...PUMP IMPELLERS             | RECOMMENDED--CONSULT THE TERMS      |                     | % GENERATORS                  |
| ..ROTARY WINGS                | LISTED BELOW)                       |                     |                               |
|                               | ARMATURES                           |                     |                               |
|                               | COMMUTATORS                         |                     |                               |

# NASA THESAURUS HIERARCHICAL UPDATE

% ROTATING ELECTRICAL MACHINES  
TURBINES  
TURBOMACHINERY

ROTATING LIQUIDS

1202  
UF LIQUID ROTATION  
GS LIQUIDS

#ROTATING LIQUIDS  
ROTATING FLUIDS  
#ROTATING LIQUIDS  
GOERTLER INSTABILITY  
PLANETARY WAVES  
ROTATION  
TRAPPED VORTICES  
VORTICES

ROTATING MATTER

2308 3009  
RT DEGENERATE MATTER  
MATTER (PHYSICS)  
ROTATION  
SPIN DYNAMICS

ROTATING MIRRORS

1405 1407 1410 2310  
GS MIRRORS  
#ROTATING MIRRORS  
RT FRAMING CAMERAS  
HIGH SPEED CAMERAS

ROTATING PLASMAS

2308 2502  
GS PARTICLES  
..CHARGED PARTICLES  
..ENERGETIC PARTICLES  
...PLASMAS (PHYSICS)  
...#ROTATING PLASMAS  
RT DRIFT RATE

NONEQUILIBRIUM PLASMAS  
PLASMA FLUX MEASUREMENT  
THETA PINCH  
TOROIDAL PLASMAS  
TWO FLUID MODELS  
ZETA PINCH

ROTATING SHAFTS

0101 0202 2308  
GS SHAFTS (MACHINE ELEMENTS)  
#ROTATING SHAFTS  
..TURBOSHAFTS

ROTATING SPHERES

0205 1901 2308 0102  
GS ROTATING BODIES

#ROTATING SPHERES  
SYMMETRICAL BODIES  
..BODIES OF REVOLUTION  
..SPHERES  
..#ROTATING SPHERES  
RT EQUATORS  
SPHERICAL SHELLS

ROTATING STALLS

1202  
RT BOUNDARY LAYER SEPARATION  
COMPRESSOR BLADES  
% ROTOR BLADES  
TURBOCOMPRESSORS

ROTATING VEHICLES

USE ROTATING BODIES  
VEHICLES

ROTATION

1504 3001 3006 3407  
UF ROTATING  
WHIRL

GS

WHIRLING  
GYRATION  
#ROTATION  
...AUTOROTATION  
...COROTATION  
...COUNTER ROTATION  
...EARTH ROTATION  
...MOLECULAR ROTATION  
...MUON SPIN ROTATION  
...PLANETARY ROTATION  
...SATELLITE ROTATION  
...STELLAR ROTATION  
...SOLAR ROTATION  
ANGULAR ACCELERATION  
ANGULAR VELOCITY  
AXES OF ROTATION  
CIRCULATION  
CORIOLIS EFFECT  
CROSS POLARIZATION  
FARADAY EFFECT  
IMAGE ROTATION  
LIBRATION  
% MOTION

RT

%

NUTATION  
PITCH (INCLINATION)  
POLARIZATION (SPIN ALIGNMENT)  
POLARIZATION (WAVES)  
PRECSSION  
REVOLVING  
ROLL  
ROTARY STABILITY  
ROTATING BODIES

ROTATING LIQUIDS  
ROTATING MATTER  
ROTONS  
TORQUE  
VORTEX AVOIDANCE  
VORTICES  
YAW

ROTATIONAL FLOW  
USE FLUID FLOW  
VORTICES

ROTATIONAL SPECTRA

0601  
GS SPECTRA  
..MOLECULAR SPECTRA  
..#ROTATIONAL SPECTRA  
RT ABSORPTION SPECTRA  
LINE SPECTRA  
MOLECULAR EXCITATION  
MOLECULAR ROTATION  
MOLECULAR SPECTROSCOPY  
ROTATIONAL STATES  
VIBRATIONAL SPECTRA

ROTATIONAL STATES

2311 2404  
SN (LIMITED TO MOLECULAR ENERGY  
LEVELS - EXCLUDES ROTATIONAL  
DYNAMICS OF VEHICLES OR OTHER  
BODIES)

GS

LEVEL (QUANTITY)  
..ENERGY LEVELS  
...MOLECULAR ENERGY LEVELS  
...#ROTATIONAL STATES  
RT MOLECULAR EXCITATION  
ROTATIONAL SPECTRA

ROTIFERA

0402 0407  
GS ANIMALS  
..INVERTEBRATES  
..#ROTIFERA  
MICROORGANISMS  
#ROTIFERA  
RT WORMS

ROTOCHUTES

0208  
GS PARACHUTES  
#ROTOCHUTES  
RT AUTOROTATION

ROTONS

2303 2308

[illegible]

[illegible]

POLYISOPRENES

RUBBER COATINGS  
1504 3404  
GS COATINGS  
#RUBBER COATINGS  
RT PAINTS  
PROTECTIVE COATINGS

RUBIDIUM  
1703  
GS CHEMICAL ELEMENTS  
.ALKALI METALS  
#RUBIDIUM  
...RUBIDIUM ISOTOPES  
....RUBIDIUM 86  
METALS  
.ALKALI METALS  
#RUBIDIUM  
...RUBIDIUM ISOTOPES  
....RUBIDIUM 86

RUBIDIUM COMPOUNDS  
1804  
RT % ALKALI METAL COMPOUNDS  
% CHEMICAL COMPOUNDS  
% METAL COMPOUNDS

RUBIDIUM ISOTOPES  
2406  
GS CHEMICAL ELEMENTS  
.ALKALI METALS  
#RUBIDIUM  
...RUBIDIUM ISOTOPES  
....RUBIDIUM 86  
NUCLIDES  
ISOTOPES  
#RUBIDIUM ISOTOPES  
...RUBIDIUM 86  
METALS  
.ALKALI METALS  
#RUBIDIUM  
...RUBIDIUM ISOTOPES  
....RUBIDIUM 86

RUBIDIUM 86  
1703 2406  
GS CHEMICAL ELEMENTS  
.ALKALI METALS  
#RUBIDIUM  
...RUBIDIUM ISOTOPES  
....RUBIDIUM 86  
NUCLIDES  
ISOTOPES  
#RUBIDIUM ISOTOPES  
...RUBIDIUM 86  
NUCLIDES  
...RADIOACTIVE ISOTOPES

...#RUBIDIUM 86  
...RUBIDIUM ISOTOPES  
...#RUBIDIUM 86  
METALS  
.ALKALI METALS  
#RUBIDIUM  
...RUBIDIUM ISOTOPES  
....RUBIDIUM 86

RUBIS ROCKET VEHICLE  
3106  
GS ROCKET VEHICLES  
.MULTISTAGE ROCKET VEHICLES  
#RUBIS ROCKET VEHICLE  
RT SOLID PROPELLANT ROCKET ENGINES

RUBY  
1601 1806 2601  
RT ALUMINUM OXIDES  
CRYSTALS

RUBY LASERS  
1601 2306  
GS ELECTRONIC EQUIPMENT  
.SOLID STATE DEVICES  
..SOLID STATE LASERS  
..#RUBY LASERS  
STIMULATED EMISSION DEVICES  
.LASERS  
..SOLID STATE LASERS  
..#RUBY LASERS  
PULSED LASERS  
Q SWITCHED LASERS  
VERNEUIL PROCESS

RT

RUDDERS  
0101 0104 0202 1402  
GS CONTROL SURFACES  
#RUDDERS  
..AERIAL RUDDERS  
..MARINE RUDDERS  
RT AIRFOILS  
FINS  
PINTLES  
STABILIZERS (FLUID DYNAMICS)  
SWEEPBACK TAIL SURFACES  
TABS (CONTROL SURFACES)  
TAIL ASSEMBLIES  
TAIL SURFACES  
TRAPEZOIDAL TAIL SURFACES

RUGGEDNESS  
3408  
RT DURABILITY  
% HIGH RESISTANCE

MECHANICAL PROPERTIES  
% RIGIDITY

RULER METHOD  
1902  
RT % METHODOLOGY

RULES  
3403 1902  
GS #RULES  
.FLIGHT RULES  
..INSTRUMENT FLIGHT RULES  
..VISUAL FLIGHT RULES  
..PALMGREN-MINER RULE  
..PHASE RULE  
..SELECTION RULES (NUCLEAR PHYSICS)  
..SUM RULES  
..WHITHAM RULE  
LAWS  
RT PATENT POLICY  
POLICIES  
PROCUREMENT POLICY  
REGULATIONS  
SEA LAW

RUMANIA  
USE ROMANIA

RUN TIME (COMPUTERS)  
0802  
RT COMPUTER PROGRAMMING  
COMPUTERS  
TIME SHARING

RUNGE-KUTTA METHOD  
1902 3501  
GS ANALYSIS (MATHEMATICS)  
.NUMERICAL ANALYSIS  
..NUMERICAL INTEGRATION  
...#RUNGE-KUTTA METHOD  
..REAL VARIABLES  
..MEASURE AND INTEGRATION  
...NUMERICAL INTEGRATION  
...#RUNGE-KUTTA METHOD  
RT % METHODOLOGY

RUNNING  
3404 3406 3407  
RT % OPERATIONS  
PHYSICAL EXERCISE

RUNOFFS  
USE DRAINAGE

RUNWAY ALIGNMENT

# NASA THESAURUS HIERARCHICAL UPDATE

|                     |                              |  |  |
|---------------------|------------------------------|--|--|
| 1101 1102           |                              |  |  |
| SN                  | (ALIGNMENT WITH RUNWAYS--NOT |  |  |
|                     | ALIGNMENT OF RUNWAYS)        |  |  |
| RT                  | AIRCRAFT LANDING             |  |  |
|                     | TAKEOFF RUNS                 |  |  |
| RUNWAY CONDITIONS   |                              |  |  |
| O203 1101 1102      |                              |  |  |
| GS                  | CONDITIONS                   |  |  |
| RT                  | #RUNWAY CONDITIONS           |  |  |
|                     | AVIATION METEOROLOGY         |  |  |
|                     | ICE                          |  |  |
|                     | RUNWAYS                      |  |  |
|                     | SLUSH                        |  |  |
|                     | SURFACE ROUGHNESS            |  |  |
|                     | WATER                        |  |  |
|                     | WEATHER                      |  |  |
| RUNWAY LIGHTS       |                              |  |  |
| O203 1101 1102 2306 |                              |  |  |
| GS                  | LANDING AIDS                 |  |  |
|                     | .AIRPORT LIGHTS              |  |  |
|                     | .#RUNWAY LIGHTS              |  |  |
|                     | LIGHTING EQUIPMENT           |  |  |
|                     | LUMINAIRES                   |  |  |
|                     | ..AIRPORT LIGHTS             |  |  |
|                     | ..#RUNWAY LIGHTS             |  |  |
| RT                  | APPROACH CONTROL             |  |  |
|                     | % FLARES                     |  |  |
|                     | % MARKERS                    |  |  |
|                     | RUNWAYS                      |  |  |
|                     | SEARCHLIGHTS                 |  |  |
|                     | VISUAL CONTROL               |  |  |
| RUNWAYS             |                              |  |  |
| O203 1101 1102      |                              |  |  |
| RT                  | AIRFIELD SURFACE MOVEMENTS   |  |  |
|                     | AIRPORTS                     |  |  |
|                     | LANDING                      |  |  |
|                     | LANDING AIDS                 |  |  |
|                     | LANDING MATS                 |  |  |
|                     | LANDING SITES                |  |  |
|                     | PAVEMENTS                    |  |  |
|                     | RUNWAY CONDITIONS            |  |  |
|                     | RUNWAY LIGHTS                |  |  |
| % STRIP             |                              |  |  |
|                     | TAKEOFF                      |  |  |
|                     | TAXIING                      |  |  |
| RUPTURING           |                              |  |  |
| 1704 3204           |                              |  |  |
| RT % BLISTERS       |                              |  |  |
|                     | BURSTS                       |  |  |
|                     | CRACKING (FRACTURING)        |  |  |
|                     | DISRUPTING                   |  |  |
| FAILURE             |                              |  |  |
| FRACTURE MECHANICS  |                              |  |  |
| METAL FATIGUE       |                              |  |  |
| SELF SEALING        |                              |  |  |
| STRUCTURAL STRAIN   |                              |  |  |
| TEARING             |                              |  |  |
| RURAL AREAS         |                              |  |  |
| 3402                |                              |  |  |
| RT                  | AGRICULTURE                  |  |  |
|                     | FARMLANDS                    |  |  |
|                     | GRASSLANDS                   |  |  |
|                     | LAND                         |  |  |
|                     | MEGALOPOLISES                |  |  |
|                     | RANGELANDS                   |  |  |
|                     | REGIONAL PLANNING            |  |  |
|                     | RESIDENTIAL AREAS            |  |  |
|                     | SUBURBAN AREAS               |  |  |
|                     | WILDERNESS                   |  |  |
| RURAL LAND USE      |                              |  |  |
| 1303 1304 1308 3404 |                              |  |  |
| GS                  | LAND USE                     |  |  |
| RT                  | #RURAL LAND USE              |  |  |
|                     | AGRICULTURE                  |  |  |
|                     | CONSERVATION                 |  |  |
|                     | % DEVELOPMENT                |  |  |
|                     | EARTH RESOURCES              |  |  |
|                     | FARMLANDS                    |  |  |
|                     | GRASSLANDS                   |  |  |
|                     | GRAZING                      |  |  |
|                     | GREAT PLAINS CORRIDOR (NORTH |  |  |
|                     | AMERICA)                     |  |  |
|                     | LAND                         |  |  |
|                     | LAND MANAGEMENT              |  |  |
|                     | ORCHARDS                     |  |  |
|                     | RANGELANDS                   |  |  |
|                     | REGIONAL PLANNING            |  |  |
|                     | SITES                        |  |  |
| RUSSIA              |                              |  |  |
| USE                 | RUSSIAN FEDERATION           |  |  |
| RUSSIAN FEDERATION  |                              |  |  |
| 1305                |                              |  |  |
| UF                  | RUSSIA                       |  |  |
| GS                  | NATIONS                      |  |  |
| RT                  | #RUSSIAN FEDERATION          |  |  |
|                     | ASIA                         |  |  |
|                     | EUROPE                       |  |  |
| RUST FUNGI          |                              |  |  |
| O404 O407 O409      |                              |  |  |
| UF                  | RUSTS (BOTANY)               |  |  |
| GS                  | PLANTS (BOTANY)              |  |  |
| - FUNGI             |                              |  |  |
| ..#RUST FUNGI       |                              |  |  |
| RT                  | BLIGHT                       |  |  |
| % MOLD              |                              |  |  |
| PARASITIC DISEASES  |                              |  |  |
| PLANT DISEASES      |                              |  |  |
| RUSTING             |                              |  |  |
| O603 1702           |                              |  |  |
| GS                  | CHEMICAL REACTIONS           |  |  |
|                     | .OXIDATION                   |  |  |
|                     | ..#RUSTING                   |  |  |
|                     | CORROSION                    |  |  |
| RT                  | #RUSTING                     |  |  |
|                     | ATMOSPHERIC EFFECTS          |  |  |
|                     | CHEMICAL ATTACK              |  |  |
|                     | COATINGS                     |  |  |
|                     | CORROSION RESISTANCE         |  |  |
|                     | DEGRADATION                  |  |  |
|                     | DESENSITIZING                |  |  |
|                     | DETERIORATION                |  |  |
|                     | HOT CORROSION                |  |  |
|                     | METAL-WATER REACTIONS        |  |  |
|                     | OXIDATION RESISTANCE         |  |  |
|                     | PASSIVITY                    |  |  |
|                     | SCALE (CORROSION)            |  |  |
|                     | WEATHERING                   |  |  |
| RUSTS (BOTANY)      |                              |  |  |
| USE                 | RUST FUNGI                   |  |  |
| RUTHENIUM           |                              |  |  |
| 1703                |                              |  |  |
| GS                  | CHEMICAL ELEMENTS            |  |  |
|                     | #RUTHENIUM                   |  |  |
|                     | ..RUTHENIUM ISOTOPES         |  |  |
|                     | METALS                       |  |  |
|                     | .NOBLE METALS                |  |  |
|                     | ..#RUTHENIUM                 |  |  |
|                     | ...RUTHENIUM ISOTOPES        |  |  |
|                     | .TRANSITION METALS           |  |  |
|                     | ..#RUTHENIUM                 |  |  |
|                     | ...RUTHENIUM ISOTOPES        |  |  |
| RUTHENIUM ALLOYS    |                              |  |  |
| 1701 1704           |                              |  |  |
| GS                  | ALLOYS                       |  |  |
|                     | #RUTHENIUM ALLOYS            |  |  |
| RUTHENIUM COMPOUNDS |                              |  |  |
| O603 1703           |                              |  |  |
| RT %                | CHEMICAL COMPOUNDS           |  |  |
| %                   | METAL COMPOUNDS              |  |  |
|                     | TRANSITION METALS            |  |  |

|                                  |  |                                    |
|----------------------------------|--|------------------------------------|
| RUTHENIUM ISOTOPES               |  | % THEORIES                         |
| 2406                             |  | S STARS                            |
| UF RUTHENIUM 106                 |  | 3001                               |
| GS CHEMICAL ELEMENTS             |  | GS CELESTIAL BODIES                |
| ..NUCLIDES                       |  | .STARS                             |
| ..ISOTOPES                       |  | ..LATE STARS                       |
| ..#RUTHENIUM ISOTOPES            |  | ...COOL STARS                      |
| .RUTHENIUM                       |  | ...#S STARS                        |
| .#RUTHENIUM ISOTOPES             |  | ASYMPTOTIC GIANT BRANCH STARS      |
| METALS                           |  | RT GIANT STARS                     |
| .NOBLE METALS                    |  | M STARS                            |
| ..RUTHENIUM                      |  | MIRA VARIABLES                     |
| ..#RUTHENIUM ISOTOPES            |  | RED GIANT STARS                    |
| .TRANSITION METALS               |  |                                    |
| ..RUTHENIUM                      |  |                                    |
| ..#RUTHENIUM ISOTOPES            |  |                                    |
|                                  |  |                                    |
| RUTHENIUM 106                    |  | S WAVES                            |
| USE RUTHENIUM ISOTOPES           |  | 1202 SECONDARY WAVES               |
|                                  |  | UF SHEAR DISTURBANCES              |
|                                  |  | SH WAVE                            |
|                                  |  | ELASTIC WAVES                      |
|                                  |  | GS #S WAVES                        |
|                                  |  | ..SH WAVES                         |
|                                  |  | CRUSTAL FRACTURES                  |
|                                  |  | DILATATIONAL WAVES                 |
|                                  |  | P WAVES                            |
|                                  |  | POLARIZED ELASTIC WAVES            |
|                                  |  | RAYLEIGH WAVES                     |
|                                  |  | SEISMIC WAVES                      |
|                                  |  | SURFACE WAVES                      |
|                                  |  | TRANSVERSE WAVES                   |
|                                  |  |                                    |
|                                  |  | S-A-W DEVICES                      |
|                                  |  | USE SURFACE ACOUSTIC WAVE DEVICES  |
|                                  |  |                                    |
|                                  |  | S-N DIAGRAMS                       |
|                                  |  | 1108 1704 2308 2311 3204           |
|                                  |  | UF FATIGUE DIAGRAMS                |
|                                  |  | GS DIAGRAMS                        |
|                                  |  | #S-N DIAGRAMS                      |
|                                  |  | RT BENDING FATIGUE                 |
|                                  |  | CYCLIC LOADS                       |
|                                  |  | FATIGUE (MATERIALS)                |
|                                  |  | FATIGUE LIFE                       |
|                                  |  | FATIGUE TESTS                      |
|                                  |  | METAL FATIGUE                      |
|                                  |  | STRESS ANALYSIS                    |
|                                  |  | STRESS CYCLES                      |
|                                  |  | STRESS MEASUREMENT                 |
|                                  |  | STRESS RATIO                       |
|                                  |  |                                    |
|                                  |  | S-2 AIRCRAFT                       |
|                                  |  | O207                               |
|                                  |  | UF SNOW AERIAL APPLICATOR AIRCRAFT |
|                                  |  | S-2B                               |
|                                  |  |                                    |
| RYAN MILITARY AIRCRAFT           |  |                                    |
| USE RYAN AIRCRAFT                |  |                                    |
|                                  |  |                                    |
| RYDBERG SERIES                   |  |                                    |
| 1411 2401 3009                   |  |                                    |
| GS SPECTRA                       |  |                                    |
| ..RADIATION SPECTRA              |  |                                    |
| ..ELECTROMAGNETIC SPECTRA        |  |                                    |
| ...LINE SPECTRA                  |  |                                    |
| ...#RYDBERG SERIES               |  |                                    |
| ABSORPTION SPECTRA               |  |                                    |
| ATOMIC SPECTRA                   |  |                                    |
| ELECTRON TRANSITIONS             |  |                                    |
| EMISSION SPECTRA                 |  |                                    |
| H LINES                          |  |                                    |
| HYDROGEN                         |  |                                    |
|                                  |  |                                    |
| RT                               |  |                                    |
| ABSORPTION SPECTRA               |  |                                    |
| ATOMIC SPECTRA                   |  |                                    |
| ELECTRON TRANSITIONS             |  |                                    |
| EMISSION SPECTRA                 |  |                                    |
| H LINES                          |  |                                    |
| HYDROGEN                         |  |                                    |
|                                  |  |                                    |
| R5D AIRCRAFT                     |  |                                    |
| USE C-54 AIRCRAFT                |  |                                    |
|                                  |  |                                    |
| R7V AIRCRAFT                     |  |                                    |
| USE C-121 AIRCRAFT               |  |                                    |
| EC-121 AIRCRAFT                  |  |                                    |
|                                  |  |                                    |
| S BAND                           |  |                                    |
| USE SUPERHIGH FREQUENCIES        |  |                                    |
| ULTRAHIGH FREQUENCIES            |  |                                    |
|                                  |  |                                    |
| S CURVES                         |  |                                    |
| 1902                             |  |                                    |
| GS GEOMETRY                      |  |                                    |
| .CURVES (GEOMETRY)               |  |                                    |
| .#S CURVES                       |  |                                    |
| ...GOMPertz CURVES               |  |                                    |
| .EUCLIDEAN GEOMETRY              |  |                                    |
| ..ANALYTIC GEOMETRY              |  |                                    |
| ..#S CURVES                      |  |                                    |
| ....GOMPertz CURVES              |  |                                    |
|                                  |  |                                    |
| S GLASS                          |  |                                    |
| 1804 1805                        |  |                                    |
| GS GLASS                         |  |                                    |
| .E GLASS                         |  |                                    |
| .#S GLASS                        |  |                                    |
| RT COMPOSITE MATERIALS           |  |                                    |
| GLASS FIBER REINFORCED PLASTICS  |  |                                    |
| GLASS FIBERS                     |  |                                    |
| SILICON DIOXIDE                  |  |                                    |
|                                  |  |                                    |
| S MATRIX THEORY                  |  |                                    |
| 1902                             |  |                                    |
| UF SCATTERING MATRIX             |  |                                    |
| RT OPERATORS (MATHEMATICS)       |  |                                    |
| SCATTERING CROSS SECTIONS        |  |                                    |
|                                  |  |                                    |
| RWANDA                           |  |                                    |
| 1305                             |  |                                    |
| UF RUANDA-URUNDI                 |  |                                    |
| GS NATIONS                       |  |                                    |
| #RWANDA                          |  |                                    |
| AFRICA                           |  |                                    |
| BURUNDI                          |  |                                    |
|                                  |  |                                    |
| RYAN AIRCRAFT                    |  |                                    |
| O207                             |  |                                    |
| UF RYAN MILITARY AIRCRAFT        |  |                                    |
| GS #RYAN AIRCRAFT                |  |                                    |
| .FIREBEE 2 TARGET DRONE AIRCRAFT |  |                                    |
| .X-13 AIRCRAFT                   |  |                                    |
| .XC-142 AIRCRAFT                 |  |                                    |
| .XV-5 AIRCRAFT                   |  |                                    |
| .XV-8A AIRCRAFT                  |  |                                    |
| RT % AIRCRAFT                    |  |                                    |



# NASA THESAURUS HIERARCHICAL UPDATE

|                                |                                    |                                |
|--------------------------------|------------------------------------|--------------------------------|
| SNOW S-2 AIRCRAFT              | TRANSPORT AIRCRAFT                 | RT % AIRCRAFT                  |
| US-2A AIRCRAFT                 | #S-58 HELICOPTER                   | SA-330 HELICOPTER              |
| MONOPLANES                     | V-STOL AIRCRAFT                    | O206                           |
| #S-2 AIRCRAFT                  | .ROTARY WING AIRCRAFT              | UF                             |
| SNOW AIRCRAFT                  | ..HELICOPTERS                      | GS                             |
| #S-2 AIRCRAFT                  | ...MILITARY HELICOPTERS            | SUD AVIATION SA-330 HELICOPTER |
| UTILITY AIRCRAFT               | ...#S-58 HELICOPTER                | .ALOUETTE HELICOPTERS          |
| #S-2 AIRCRAFT                  | CH-34 HELICOPTER                   | .#SA-330 HELICOPTER            |
| RT % AIRCRAFT                  | UH-34 HELICOPTER                   | TRANSPORT AIRCRAFT             |
|                                |                                    | #SA-330 HELICOPTER             |
|                                |                                    | V-STOL AIRCRAFT                |
| S-3 AIRCRAFT                   | S-61 HELICOPTER                    | .ROTARY WING AIRCRAFT          |
| O201 O207                      | O206 O207                          | ..HELICOPTERS                  |
| GS                             | UF SIKORSKY S-61 HELICOPTER        | ...ALOUETTE HELICOPTERS        |
| ANTISUBMARINE WARFARE AIRCRAFT | GS SIKORSKY AIRCRAFT               | ...#SA-330 HELICOPTER          |
| #S-3 AIRCRAFT                  | #S-61 HELICOPTER                   | ...MILITARY HELICOPTERS        |
| RT % AIRCRAFT                  | TRANSPORT AIRCRAFT                 | RT % AIRCRAFT                  |
| % MILITARY AIRCRAFT            | #S-61 HELICOPTER                   | SAAB AIRCRAFT                  |
|                                | V-STOL AIRCRAFT                    | O201 O204 O207                 |
| S-3 SATELLITE                  | .ROTARY WING AIRCRAFT              | GS #SAAB AIRCRAFT              |
| USE EXPLORER 12 SATELLITE      | ..HELICOPTERS                      | .SAAB 37 AIRCRAFT              |
|                                | ...MILITARY HELICOPTERS            | .SAAB 105 AIRCRAFT             |
| S-6 SATELLITE                  | ...#S-61 HELICOPTER                | RT % AIRCRAFT                  |
| USE EXPLORER 17 SATELLITE      | AIRCRAFT                           | SAAB 37 AIRCRAFT               |
|                                | ANTISUBMARINE WARFARE AIRCRAFT     | O207                           |
| S-16 SATELLITE                 | CH-3 HELICOPTER                    | GS                             |
| USE OSO-1                      | SH-3 HELICOPTER                    | ATTACK AIRCRAFT                |
|                                | SH-4 HELICOPTER                    | .FIGHTER AIRCRAFT              |
| S-17 SATELLITE                 | WATER TAKEOFF AND LANDING AIRCRAFT | .#SAAB 37 AIRCRAFT             |
| USE OSO-2                      |                                    | JET AIRCRAFT                   |
|                                |                                    | .TURBOFAN AIRCRAFT             |
| S-18 SATELLITE                 |                                    | .#SAAB 37 AIRCRAFT             |
| USE OAO                        |                                    | SAAB AIRCRAFT                  |
|                                |                                    | #SAAB 37 AIRCRAFT              |
| S-27 SATELLITE                 |                                    | SUPERSONIC AIRCRAFT            |
| USE ALOUETTE 1 SATELLITE       |                                    | #SAAB 37 AIRCRAFT              |
|                                |                                    | RT % AIRCRAFT                  |
| S-49 SATELLITE                 |                                    | CANARD CONFIGURATIONS          |
| USE OGO-A                      |                                    | HARRIER AIRCRAFT               |
|                                |                                    |                                |
| S-50 SATELLITE                 |                                    | SAAB 105 AIRCRAFT              |
| USE OGO-C                      |                                    | O207                           |
|                                |                                    | GS                             |
| S-51 SATELLITE                 |                                    | JET AIRCRAFT                   |
| USE ARIEL 1 SATELLITE          |                                    | .TURBOFAN AIRCRAFT             |
|                                |                                    | .#SAAB 105 AIRCRAFT            |
| S-52 SATELLITE                 |                                    | LIGHT AIRCRAFT                 |
| USE ARIEL 2 SATELLITE          |                                    | #SAAB 105 AIRCRAFT             |
|                                |                                    | MONOPLANES                     |
| S-57 SATELLITE                 |                                    | #SAAB 105 AIRCRAFT             |
| USE OSO-C                      |                                    | SAAB AIRCRAFT                  |
|                                |                                    | #SAAB 105 AIRCRAFT             |
| S-58 HELICOPTER                |                                    | UTILITY AIRCRAFT               |
| O206 O207                      |                                    | #SAAB 105 AIRCRAFT             |
| UF SIKORSKY S-58 HELICOPTER    |                                    |                                |
| GS SIKORSKY AIRCRAFT           |                                    |                                |
| #S-58 HELICOPTER               |                                    |                                |

RT % AIRCRAFT  
 PASSENGER AIRCRAFT  
 SABATIER REACTION  
 1407 2306  
 GS  
 #CHEMICAL REACTIONS  
 #SABATIER REACTION  
 RT PHOTOGRAPHIC FILM  
 SABOT PROJECTILES  
 3102 3401  
 GS PROJECTILES  
 #SABOT PROJECTILES  
 RT ARTILLERY  
 FRAGMENTATION  
 GUN LAUNCHERS  
 GUNS (ORDNANCE)  
 SABOTAGE  
 3401  
 RT ACCIDENTS  
 AIR DEFENSE  
 DAMAGE  
 DEACTIVATION  
 DISASTERS  
 HAZARDS  
 INJURIES  
 PREVENTION  
 SAFETY  
 SPACE LAW  
 WRECKAGE  
 SABRE AIRCRAFT  
 USE F-86 AIRCRAFT  
 SABRELINER AIRCRAFT  
 USE T-39 AIRCRAFT  
 SACCADIC EYE MOVEMENTS  
 0404 0405 0408  
 GS EYE MOVEMENTS  
 #SACCADIC EYE MOVEMENTS  
 RT FOVEA  
 % MOTION  
 VISUAL FIELDS  
 SACCHARIDES  
 USE CARBOHYDRATES  
 SACCHAROMYCES  
 0407  
 GS PLANTS (BOTANY)  
 . FUNGI  
 . #SACCHAROMYCES  
 SACRAMENTO VALLEY (CA)  
 1305 1306  
 GS VALLEYS  
 #SACRAMENTO VALLEY (CA)  
 RT CALIFORNIA  
 RIVER BASINS  
 SADDLE POINTS  
 1902 3406  
 GS #SADDLE POINTS  
 .SADDLE POINTS (GAME THEORY)  
 RT CURVE FITTING  
 GAME THEORY  
 MINIMAX TECHNIQUE  
 SADDLE POINTS (GAME THEORY)  
 1902  
 GS GAME THEORY  
 #SADDLE POINTS (GAME THEORY)  
 SADDLE POINTS  
 #SADDLE POINTS (GAME THEORY)  
 RT OPERATIONS RESEARCH  
 SADDLES  
 % THEORIES  
 SADDLES  
 1902  
 RT SADDLE POINTS (GAME THEORY)  
 SADDLES (SUPPORTS)  
 3203  
 GS STRUCTURAL MEMBERS  
 #SADDLES (SUPPORTS)  
 SUPPORTS  
 #SADDLES (SUPPORTS)  
 SAFEGUARD SYSTEM  
 3101 3401  
 GS WEAPON SYSTEMS  
 . MISSILE SYSTEMS  
 . #SAFEGUARD SYSTEM  
 RT ANTIMISSILE DEFENSE  
 BALLISTIC MISSILES  
 MILITARY TECHNOLOGY  
 MISSILE DEFENSE  
 SENTINEL SYSTEM  
 % SYSTEMS  
 SAFETY  
 3406 4001  
 GS #SAFETY  
 . AEROSPACE SAFETY  
 . AIRCRAFT SAFETY  
 . FLIGHT SAFETY  
 . INDUSTRIAL SAFETY  
 RANGE SAFETY  
 . REACTOR SAFETY  
 ACCIDENT PREVENTION  
 ACCIDENTS  
 AIR BAG RESTRAINT DEVICES  
 CRASHES  
 % DETECTORS  
 EMERGENCY LIFE SUSTAINING SYSTEMS  
 ENERGY POLICY  
 EXPLOSIONS  
 FIRE PREVENTION  
 FIREPROOFING  
 FIRES  
 HAZARDS  
 PREVENTION  
 PROTECTION  
 SABOTAGE  
 % STORAGE  
 VORTEX AVOIDANCE  
 WARNING  
 WARNING SYSTEMS  
 SAFETY DEVICES  
 0203 0508 3404  
 GS #SAFETY DEVICES  
 . ABORT APPARATUS  
 . AIR BAG RESTRAINT DEVICES  
 . ARRESTING GEAR  
 . EJECTION SEATS  
 . . FLYING EJECTION SEATS  
 . ESCAPE CAPSULES  
 . ESCAPE ROCKETS  
 . HELMETS  
 . SEAT BELTS  
 ACCIDENT PREVENTION  
 ACCIDENT PRONENESS  
 ACCIDENTS  
 AIRCRAFT SAFETY  
 AMBULANCES  
 ANTISKID DEVICES  
 AUTOMOBILE ACCIDENTS  
 % BARRIERS  
 CHEMICAL DEFENSE  
 DEFLECTORS  
 % DEVICES  
 EMERGENCY LIFE SUSTAINING SYSTEMS  
 ENCLOSURES  
 % EQUIPMENT  
 FAIL-SAFE SYSTEMS  
 FIRE PREVENTION  
 FLAME DEFLECTORS  
 FLIGHT SAFETY  
 GATES (OPENINGS)  
 GUARDS (SHIELDS)  
 HARNESES

# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |    |          |                |
|------------------------------------|----|----------|----------------|
| HAZARDS                            | RT | AEROSOLS | REMOTE REGIONS |
| HUMAN FACTORS ENGINEERING          |    | OZONE    |                |
| LANDING AIDS                       |    |          |                |
| PRESSURE SUITS                     |    |          |                |
| PROTECTION                         |    |          |                |
| PROTECTIVE CLOTHING                |    |          |                |
| PROTECTORS                         |    |          |                |
| RADIATION MEASURING INSTRUMENTS    |    |          |                |
| RADIATION SHIELDING                |    |          |                |
| SHIELDING                          |    |          |                |
| SMOKE DETECTORS                    |    |          |                |
| SPACE SUITS                        |    |          |                |
| SPACECRAFT SHIELDING               |    |          |                |
| WARNING                            |    |          |                |
| WARNING SYSTEMS                    |    |          |                |
| SAFETY FACTORS                     |    |          |                |
| 0502 0505 1103 1905                |    |          |                |
| RT                                 |    |          |                |
| ACCIDENT PRONENESS                 |    |          |                |
| AEROSPACE SAFETY                   |    |          |                |
| DESIGN ANALYSIS                    |    |          |                |
| ESCAPE SYSTEMS                     |    |          |                |
| HAZARDS                            |    |          |                |
| HEALTH PHYSICS                     |    |          |                |
| RELIABILITY                        |    |          |                |
| STABILITY                          |    |          |                |
| SAFETY MANAGEMENT                  |    |          |                |
| 0410 0502 0506 0507 0508 3404 3406 |    |          |                |
| 3409                               |    |          |                |
| GS                                 |    |          |                |
| MANAGEMENT                         |    |          |                |
| #SAFETY MANAGEMENT                 |    |          |                |
| ACCIDENT PREVENTION                |    |          |                |
| AEROSPACE SAFETY                   |    |          |                |
| EDUCATION                          |    |          |                |
| FAIL-SAFE SYSTEMS                  |    |          |                |
| FIRE PREVENTION                    |    |          |                |
| GUARDS (SHIELDS)                   |    |          |                |
| HAZARDS                            |    |          |                |
| HUMAN FACTORS ENGINEERING          |    |          |                |
| PRODUCTION MANAGEMENT              |    |          |                |
| WARNING SYSTEMS                    |    |          |                |
| SAGE AIR DEFENSE SYSTEM            |    |          |                |
| 3401                               |    |          |                |
| GS                                 |    |          |                |
| AIR DEFENSE                        |    |          |                |
| #SAGE AIR DEFENSE SYSTEM           |    |          |                |
| RT % SYSTEMS                       |    |          |                |
| SAGE SATELLITE                     |    |          |                |
| 3107                               |    |          |                |
| UF                                 |    |          |                |
| STRATOSPHERIC AEROSOL & GAS        |    |          |                |
| EXPERIMENT                         |    |          |                |
| ARTIFICIAL SATELLITES              |    |          |                |
| GS                                 |    |          |                |
| #SAGE SATELLITE                    |    |          |                |
| SAGINAW BAY (MI)                   |    |          |                |
| 1303 1304 1306                     |    |          |                |
| GS                                 |    |          |                |
| BAYS (TOPOGRAPHIC FEATURES)        |    |          |                |
| #SAGINAW BAY (MI)                  |    |          |                |
| RT                                 |    |          |                |
| INLETS (TOPOGRAPHY)                |    |          |                |
| LAKE HURON                         |    |          |                |
| MICHIGAN                           |    |          |                |
| RIVER BASINS                       |    |          |                |
| SAGITTARIUS CONSTELLATION          |    |          |                |
| 3001                               |    |          |                |
| GS                                 |    |          |                |
| CONSTELLATIONS                     |    |          |                |
| #SAGITTARIUS CONSTELLATION         |    |          |                |
| SAGNAC EFFECT                      |    |          |                |
| 1403 1405 2306 2310 2402           |    |          |                |
| GS                                 |    |          |                |
| PHASE SHIFT                        |    |          |                |
| #SAGNAC EFFECT                     |    |          |                |
| RT                                 |    |          |                |
| ANGULAR VELOCITY                   |    |          |                |
| ASTRONOMICAL INTERFEROMETRY        |    |          |                |
| ETALONS                            |    |          |                |
| FIBER OPTICS                       |    |          |                |
| INTERFEROMETERS                    |    |          |                |
| INTERFEROMETRY                     |    |          |                |
| LASER GYROSCOPES                   |    |          |                |
| LASER INTERFEROMETRY               |    |          |                |
| LIGHT TRANSMISSION                 |    |          |                |
| NONLINEAR OPTICS                   |    |          |                |
| OPTICAL GYROSCOPES                 |    |          |                |
| OPTICAL PATHS                      |    |          |                |
| SPECKLE INTERFEROMETRY             |    |          |                |
| WAVE PROPAGATION                   |    |          |                |
| SAHA EQUATIONS                     |    |          |                |
| 1002 2404 3304                     |    |          |                |
| RT                                 |    |          |                |
| ARC HEATING                        |    |          |                |
| ELECTRIC ARCS                      |    |          |                |
| % EQUATIONS                        |    |          |                |
| ION DENSITY (CONCENTRATION)        |    |          |                |
| IONIZATION POTENTIALS              |    |          |                |
| TEMPERATURE                        |    |          |                |
| SAHARA DESERT (AFRICA)             |    |          |                |
| 1305                               |    |          |                |
| GS                                 |    |          |                |
| LAND                               |    |          |                |
| .DESERTS                           |    |          |                |
| #SAHARA DESERT (AFRICA)            |    |          |                |
| RT                                 |    |          |                |
| AFRICA                             |    |          |                |
| ARID LANDS                         |    |          |                |
| BARREN LAND                        |    |          |                |
| DESERTIFICATION                    |    |          |                |
| DUNES                              |    |          |                |
| SAIL PROJECT                       |    |          |                |
| 0505 0507 3104 3110 3409           |    |          |                |
| UF                                 |    |          |                |
| SHUTTLE AVIONICS INTEGRATION       |    |          |                |
| LABORATORY                         |    |          |                |
| GS                                 |    |          |                |
| PROGRAMS                           |    |          |                |
| .NASA PROGRAMS                     |    |          |                |
| ..NASA SPACE PROGRAMS              |    |          |                |
| ..#SAIL PROJECT                    |    |          |                |
| .PROJECTS                          |    |          |                |
| ..#SAIL PROJECT                    |    |          |                |
| .SPACE PROGRAMS                    |    |          |                |
| ..NASA SPACE PROGRAMS              |    |          |                |
| ..#SAIL PROJECT                    |    |          |                |
| RT                                 |    |          |                |
| EARTH VIEWING APPLICATIONS         |    |          |                |
| LABORATORY                         |    |          |                |
| LABORATORIES                       |    |          |                |
| SPACE LABORATORIES                 |    |          |                |
| SPACE SHUTTLES                     |    |          |                |
| SAILPLANES                         |    |          |                |
| USE GLIDERS                        |    |          |                |
| SAILS                              |    |          |                |
| 0101 3006                          |    |          |                |
| GS                                 |    |          |                |
| #SAILS                             |    |          |                |
| .SAILWINGS                         |    |          |                |
| .SOLAR SAILS                       |    |          |                |
| RT                                 |    |          |                |
| FINS                               |    |          |                |
| GLIDERS                            |    |          |                |
| TAIL ASSEMBLIES                    |    |          |                |
| SAILWINGS                          |    |          |                |
| 0201 0205                          |    |          |                |
| UF                                 |    |          |                |
| PRINCETON SAILWINGS                |    |          |                |
| GS                                 |    |          |                |
| FOLDING STRUCTURES                 |    |          |                |
| #SAILWINGS                         |    |          |                |
| SAILS                              |    |          |                |
| #SAILWINGS                         |    |          |                |
| RT                                 |    |          |                |
| GLIDERS                            |    |          |                |
| HANG GLIDERS                       |    |          |                |
| KA-6 SAILPLANES                    |    |          |                |
| SAINT ELMO FIRE                    |    |          |                |
| 0605 2304                          |    |          |                |
| GS                                 |    |          |                |
| ELECTRIC CURRENT                   |    |          |                |
| .ELECTRIC DISCHARGES               |    |          |                |
| .#SAINT ELMO FIRE                  |    |          |                |
| RT                                 |    |          |                |
| FIRES                              |    |          |                |
| SAINT VENANT FLEXURE PROBLEM       |    |          |                |
| USE SAINT VENANT PRINCIPLE         |    |          |                |
| SAINT VENANT PRINCIPLE             |    |          |                |

3203  
 UF SAINT VENANT FLEXURE PROBLEM  
 ST VENANT FLEXURE PROBLEM  
 RT PLASTIC DEFORMATION  
 STATIC DEFORMATION  
 STATIC LOADS  
 STRESS ANALYSIS  
 STRESS CONCENTRATION  
 TEMPERATURE INVERSIONS

SALICYLATES  
 O403 0603 1808  
 GS #SALICYLATES  
 .SODIUM SALICYLATES  
 RT ACETYSALICYLIC ACID  
 DRUGS  
 ESTERS

SALINITY  
 O601 0603  
 GS CHEMICAL PROPERTIES  
 #SALINITY  
 RT ALKALINITY  
 BRINES  
 CORE SAMPLING  
 DESALINIZATION  
 OCEAN CURRENTS  
 OCEANOGRAPHIC PARAMETERS  
 SEA WATER

SALIVA  
 O403 0405  
 GS BODY FLUIDS  
 #SALIVA  
 RT DIGESTIVE SYSTEM  
 MUCUS  
 SALIVARY GLANDS

SALIVARY GLANDS  
 O404  
 UF PAROTID GLAND  
 GS ANATOMY  
 .DIGESTIVE SYSTEM  
 .#SALIVARY GLANDS  
 .GLANDS (ANATOMY)  
 .#SALIVARY GLANDS  
 RT MOUTH  
 SALIVA

SALMONELLA  
 O407 0412  
 GS MICROORGANISMS  
 .BACTERIA  
 .#SALMONELLA

SALT BATHS  
 O603 2601  
 GS BATHS  
 #SALT BATHS  
 RT BRINES  
 HEAT TREATMENT  
 MOLTEN SALTS

SALT BEDS  
 1704  
 GS LANDFORMS  
 .BEDS (GEOLOGY)  
 .#SALT BEDS  
 RT BRINES  
 BROMIDES  
 CHLORIDES  
 FLATS (LANDFORMS)  
 SODIUM CHLORIDES

SALT FLATS  
 USE FLATS (LANDFORMS)

SALT SPRAY TESTS  
 1108 3501  
 GS CHEMICAL TESTS  
 #SALT SPRAY TESTS  
 ENVIRONMENTAL TESTS  
 .CORROSION TESTS  
 .#SALT SPRAY TESTS  
 RT CORROSION  
 CORROSION RESISTANCE  
 SPRAY INGESTION  
 STRESS CORROSION  
 % TESTS

SALTON SEA (CA)  
 1305  
 GS SEAS  
 #SALTON SEA (CA)  
 RT CALIFORNIA  
 DESERTS

% SALTS  
 O603 1704 1804 1808  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT HALITES  
 INORGANIC COMPOUNDS  
 MOLTEN SALTS  
 ORGANIC CHARGE TRANSFER SALTS  
 ORGANIC COMPOUNDS  
 SODIUM CHLORIDES  
 SULFONATES

SALTUT SPACE STATION  
 3009 3109 3409  
 GS ARTIFICIAL SATELLITES  
 .SPACE STATIONS  
 .#SALTUT SPACE STATION  
 MANNED SPACECRAFT  
 #SALTUT SPACE STATION  
 SOVIET SPACECRAFT  
 #SALTUT SPACE STATION  
 STATIONS  
 .SPACE STATIONS  
 .#SALTUT SPACE STATION  
 RT SOYUZ SPACECRAFT  
 SPACE BASES  
 SPACE LABORATORIES  
 SPACECRAFT DOCKING  
 U.S.S.R. SPACE PROGRAM

SAMARITAN AIRCRAFT  
 USE C-131 AIRCRAFT

SAMARIUM  
 1703  
 GS CHEMICAL ELEMENTS  
 .RARE EARTH ELEMENTS  
 .#SAMARIUM  
 .#SAMARIUM ISOTOPES  
 METALS  
 .RARE EARTH ELEMENTS  
 .#SAMARIUM  
 .#SAMARIUM ISOTOPES

SAMARIUM COMPOUNDS  
 O603 1804  
 GS RARE EARTH COMPOUNDS  
 #SAMARIUM COMPOUNDS  
 RT % CHEMICAL COMPOUNDS  
 % METAL COMPOUNDS

SAMARIUM ISOTOPES  
 1703 2406  
 GS CHEMICAL ELEMENTS  
 .RARE EARTH ELEMENTS  
 .#SAMARIUM  
 .#SAMARIUM ISOTOPES  
 METALS  
 .RARE EARTH ELEMENTS  
 .#SAMARIUM  
 .#SAMARIUM ISOTOPES

SAMOA  
 1305  
 GS LANDFORMS  
 .ISLANDS  
 .PACIFIC ISLANDS

# NASA THESAURUS HIERARCHICAL UPDATE

..#SAMOA

SAMOS  
3107 3401  
UF SATELLITE AND MISSILE OBSERVATION  
SYSTEM  
GS ARTIFICIAL SATELLITES  
#SAMOS  
MILITARY SPACECRAFT  
.RECONNAISSANCE SPACECRAFT  
#SAMOS  
RT SATELLITE TRACKING

SAMPLED DATA SYSTEMS  
0802 1905  
RT ADAPTIVE CONTROL  
AUTOMATIC CONTROL  
CONTROL STABILITY  
CONTROL THEORY  
DATA SAMPLING  
FEEDBACK CONTROL

SAMPLERS  
0802 1905 1106 1108  
UF BOMBS (SAMPLERS)  
SAMPLING DEVICES  
RT % BOMBS  
CORE SAMPLING  
SAMPLERS  
SAMPLING  
SELECTORS  
% TEST EQUIPMENT

SAMPLES  
1505 3406  
GS #SAMPLES  
.MARS SURFACE SAMPLES  
RT ACCEPTABILITY  
MARS SAMPLE RETURN MISSIONS  
SAMPLERS  
SAMPLING  
SPECIMENS

SAMPLING  
0802 1902 1905 3404 3407  
GS #SAMPLING  
.AIR SAMPLING  
.CORE SAMPLING  
.DATA SAMPLING  
.PARTICULATE SAMPLING  
.RANDOM SAMPLING  
RT ALLOWANCES  
ASSAYING  
BAYES THEOREM  
CENSORED DATA (MATHEMATICS)

CHEMICAL ANALYSIS  
CHEMICAL TESTS  
COLLECTION  
CONCENTRATION (COMPOSITION)  
CONFIDENCE LIMITS  
COUNTING  
ESTIMATING  
EXPLORATION  
GLOBAL AIR SAMPLING PROGRAM  
HETEROGENEITY  
HOMOGENEITY  
INSPECTION  
INVESTIGATION  
PROBABILITY THEORY  
PROCESS CONTROL (INDUSTRY)  
QUALITY CONTROL  
RANDOM ERRORS  
RELIABILITY  
SAMPLERS  
SAMPLES  
SELECTION  
SEQUENTIAL ANALYSIS  
SPECIMENS  
STANDARDS  
STATISTICAL ANALYSIS  
% STATISTICS  
SWEEP CIRCUITS  
% TESTS  
VARIABILITY  
WEIBULL DENSITY FUNCTIONS

SAMPLING DEVICES  
USE SAMPLERS

SAN ANDREAS FAULT  
1304 1306  
GS GEOLOGICAL FAULTS  
#SAN ANDREAS FAULT  
RT CALIFORNIA  
CRUSTAL FRACTURES  
EARTH CRUST  
EARTHQUAKES  
MEXICO

SAN ANDREAS FAULT EXPERIMENT  
1306  
RT EARTHQUAKES  
GEOLOGICAL FAULTS

SAN FRANCISCO (CA)  
1305  
GS CITIES  
#SAN FRANCISCO (CA)  
RT CALIFORNIA

SAN FRANCISCO BAY (CA)  
1305 1310  
GS BAYS (TOPOGRAPHIC FEATURES)  
#SAN FRANCISCO BAY (CA)  
RT CALIFORNIA  
PACIFIC OCEAN  
SAN PABLO BAY (CA)

SAN JOAQUIN VALLEY (CA)  
1305 1306  
GS VALLEYS  
#SAN JOAQUIN VALLEY (CA)  
RT CALIFORNIA  
RIVER BASINS

SAN JUAN MOUNTAINS (CO)  
1306 1308  
GS LANDFORMS  
.MOUNTAINS  
#SAN JUAN MOUNTAINS (CO)  
RT COLORADO

SAN MARCO SATELLITES  
3107 3409  
GS ARTIFICIAL SATELLITES  
.METEOROLOGICAL SATELLITES  
#SAN MARCO SATELLITES  
...SAN MARCO 1 SATELLITE  
...SAN MARCO 2 SATELLITE  
...SAN MARCO 3 SATELLITE  
RT SCOUT LAUNCH VEHICLE

SAN MARCO 1 SATELLITE  
3107  
GS ARTIFICIAL SATELLITES  
.METEOROLOGICAL SATELLITES  
...SAN MARCO SATELLITES  
...SAN MARCO 1 SATELLITE

SAN MARCO 2 SATELLITE  
3107  
GS ARTIFICIAL SATELLITES  
.METEOROLOGICAL SATELLITES  
...SAN MARCO SATELLITES  
...SAN MARCO 2 SATELLITE

SAN MARCO 3 SATELLITE  
3107  
GS ARTIFICIAL SATELLITES  
.METEOROLOGICAL SATELLITES  
...SAN MARCO SATELLITES  
...SAN MARCO 3 SATELLITE

SAN MARINO  
1305

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

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OCEAN MODELS
OCEAN SURFACE
OCEANOGRAPHY
SEAS

SARSAT
3107
UF SEARCH AND RESCUE SATELLITE
GS ARTIFICIAL SATELLITES
RT #SARSAT
COSPAS
NOAA 8 SATELLITE
RECONNAISSANCE
RESCUE OPERATIONS
SEARCHING

SAS
3001 3107
UF SMALL ASTRONOMY SATELLITES
GS OBSERVATORIES
..ASTRONOMICAL OBSERVATORIES
..ASTRONOMICAL SATELLITES
...#SAS
....EXPLORER 53 SATELLITE
....SAS-1
....SAS-2
....SAS-3
RT EXPLORER 48 SATELLITE
UHURU SATELLITE

SAS-D
USE IUE

SAS-1
3001 3107
UF SMALL ASTRONOMY SATELLITE 1
GS OBSERVATORIES
..ASTRONOMICAL OBSERVATORIES
..ASTRONOMICAL SATELLITES
...#SAS
...#SAS-1
RT RADIO ASTRONOMY

SAS-2
3001 3107
UF SMALL ASTRONOMY SATELLITE 2
GS OBSERVATORIES
..ASTRONOMICAL OBSERVATORIES
..ASTRONOMICAL SATELLITES
...#SAS
...#SAS-2
RT EXPLORER 48 SATELLITE
RADIO ASTRONOMY
SPACEBORNE ASTRONOMY

SAS-3
3009 3107
UF SMALL ASTRONOMY SATELLITE 3
GS OBSERVATORIES
..ASTRONOMICAL OBSERVATORIES
..ASTRONOMICAL SATELLITES
...#SAS
...#SAS-3
RT EXPLORER 53 SATELLITE
RADIO ASTRONOMY
SPACEBORNE ASTRONOMY
X RAY ASTRONOMY

SASKATCHEWAN
1305
GS NATIONS
..CANADA
..#SASKATCHEWAN

SATAN (SENSOR)
USE TERRAIN ANALYSIS

SATELLITE ALTIMETRY
0202 0203 1901
GS ALTIMETRY
#SATELLITE ALTIMETRY
RT ALTIMETERS
GEODESY
GEODETIC SATELLITES
GEODES
GEOS 3 SATELLITE
GEOSAT SATELLITES
RADAR MEASUREMENT
SATELLITE OBSERVATION
SATELLITE-BORNE RADAR
SEASAT SATELLITES
TOPOGRAPHY

SATELLITE AND MISSILE OBSERVATION SYSTEM
USE SAMOS

SATELLITE ANTENNAS
0901
GS ANTENNAS
#SATELLITE ANTENNAS
RT FURLABLE ANTENNAS
MULTIBEAM ANTENNAS
RADIO ANTENNAS
TELECOMMUNICATION

SATELLITE ATMOSPHERES
3001
GS ENVIRONMENTS
..EXTRATERRESTRIAL ENVIRONMENTS
..#SATELLITE ATMOSPHERES

...LUNAR ATMOSPHERE
RT % ATMOSPHERES
ATMOSPHERIC CHEMISTRY
ATMOSPHERIC COMPOSITION
ATMOSPHERIC PHYSICS
EARTH ATMOSPHERE
EARTH IONOSPHERE
EARTH MAGNETOSPHERE
IONOSPHERIC COMPOSITION
MAGNETOPAUSE
NATURAL SATELLITES
PLANETARY ATMOSPHERES
STELLAR ATMOSPHERES
TITAN
TRITON
UPPER ATMOSPHERE

SATELLITE ATTITUDE CONTROL
3006 3107 3502
GS ATTITUDE CONTROL
#SATELLITE ATTITUDE CONTROL
SPACECRAFT CONTROL
.SATELLITE CONTROL
.#SATELLITE ATTITUDE CONTROL
RT ATTITUDE STABILITY
AUTOMATIC CONTROL
% CONTROL
DIRECTIONAL CONTROL
GRAVITY GRADIENT SATELLITES
JET CONTROL
LATERAL CONTROL
LONGITUDINAL CONTROL
MARQUARDT R4D ENGINE
THREE AXIS STABILIZATION
TRANSIT ATTITUDE CONTROL SATELLITE

SATELLITE ATTITUDE DISTURBANCE
USE ATTITUDE STABILITY
SPACECRAFT STABILITY

SATELLITE BREAKUP
USE SPACECRAFT BREAKUP

SATELLITE CAPTURE
USE SPACECRAFT RECOVERY

SATELLITE CLUSTERS
USE SATELLITE CONSTELLATIONS

SATELLITE COMMUNICATION
0707 3107
GS TELECOMMUNICATION
..SPACE COMMUNICATION
..SPACECRAFT COMMUNICATION
..#SATELLITE COMMUNICATION

```

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RT   ACTS
    ARPA COMPUTER NETWORK
    ASTRONICS
    CIRCUMLUNAR COMMUNICATION
    COMMUNICATION SATELLITES
    EARTH TERMINALS
    FACSIMILE COMMUNICATION
    GROUND-AIR-GROUND COMMUNICATION
    HOOP COLUMN ANTENNAS
    INTERPLANETARY COMMUNICATION
    LUNAR COMMUNICATION
    MULTIBEAM ANTENNAS
    OPTICAL COMMUNICATION
    PACKET TRANSMISSION
    PLASMA ANTENNAS
    RADIO COMMUNICATION
    SATELLITE COMMUNICATIONS SHIPS
    SATELLITE GROUND SUPPORT
    SINGLE CHANNEL PER CARRIER
    TRANSMISSION
    SYSTEM GENERATED ELECTROMAGNETIC
    PULSES
    TRANSMISSION RATE (COMMUNICATIONS)
    UNIFIED S BAND

SATELLITE COMMUNICATIONS SHIPS
1106
UF   USNS KINGSPOUT
GS   SURFACE VEHICLES
    #SATELLITE COMMUNICATIONS SHIPS
    WATER VEHICLES
    . SHIPS
    .#SATELLITE COMMUNICATIONS SHIPS
RT   SATELLITE COMMUNICATION
    SPACECRAFT COMMUNICATION

SATELLITE CONFIGURATIONS
3107 3203
GS   SPACECRAFT CONFIGURATIONS
    #SATELLITE CONFIGURATIONS
RT   AERODYNAMIC CONFIGURATIONS

SATELLITE CONSTELLATIONS
0702 2103 3107
UF   SATELLITE CLUSTERS
GS   SATELLITE NETWORKS
    #SATELLITE CONSTELLATIONS
RT   COMMUNICATION NETWORKS
    GLOBAL POSITIONING SYSTEM
    SATELLITE GROUND TRACKS
    SATELLITE NAVIGATION SYSTEMS
    SPATIAL DISTRIBUTION
    STATIONKEEPING

SATELLITE CONTROL
0707 1410 3006 3107 3502
GS   SPACECRAFT CONTROL
    #SATELLITE CONTROL
    ..SATELLITE ATTITUDE CONTROL
RT   ATTITUDE CONTROL
    AUTOMATIC CONTROL
    % CONTROL
    DIRECTIONAL CONTROL
    FLEXIBLE SPACECRAFT
    GRAVITY GRADIENT SATELLITES
    JET CONTROL
    LATERAL CONTROL
    LONGITUDINAL CONTROL
    MANUAL CONTROL
    REMOTE CONTROL
    THRUST CONTROL

SATELLITE DEFENSE
    USE SPACECRAFT DEFENSE

SATELLITE DESIGN
3009 3107 3404
GS   SPACECRAFT DESIGN
    #SATELLITE DESIGN
RT   COMPUTER AIDED DESIGN
    % DESIGN
    INDIAN SPACE PROGRAM
    JAPANESE SPACE PROGRAM
    PRODUCT DEVELOPMENT
    SPACECRAFT STRUCTURES
    STRUCTURAL DESIGN
    SYSTEMS ENGINEERING

SATELLITE DOPPLER POSITIONING
0709 1304 1305
RT   ARGOS SYSTEM
    DOPPLER EFFECT
    DOPPLER NAVIGATION
    DOPPLER RADAR
    GEODESY
    GEODETIC ACCURACY
    GEODETIC COORDINATES
    GEODETIC SATELLITES
    GEODETIC SURVEYS
    POLYSTATION DOPPLER TRACKING SYSTEM
    POSITIONING
    SATELLITE TRACKING
    TRACKING (POSITION)

SATELLITE DRAG
0101 1202 1302 3107
GS   DYNAMIC CHARACTERISTICS
    .DRAG
    .#SATELLITE DRAG

SATELLITE FRAGMENTATION
    USE SPACECRAFT BREAKUP

SATELLITE GROUND SUPPORT
0709 1102 1109 3107
RT   GROUND SUPPORT EQUIPMENT
    SATELLITE COMMUNICATION
    SPACECRAFT COMMUNICATION

SATELLITE GROUND TRACKS
0709 1109 3107
GS   GROUND TRACKS
    #SATELLITE GROUND TRACKS
RT   FLIGHT PATHS
    ORBITS
    SATELLITE CONSTELLATIONS

SATELLITE GUIDANCE
0707 1410 3006 3107 3502
GS   GUIDANCE (MOTION)
    .SPACECRAFT GUIDANCE
    .#SATELLITE GUIDANCE
RT   AUTOMATIC CONTROL
    INERTIAL GUIDANCE
    INJECTION GUIDANCE
    LOCATES SYSTEM
    MANUAL CONTROL
    REENTRY GUIDANCE
    RENDEZVOUS GUIDANCE
    SPACE NAVIGATION

SATELLITE IMAGERY
2310
GS   IMAGERY
    #SATELLITE IMAGERY
RT   ATMOSPHERIC CORRECTION
    COASTAL ZONE COLOR SCANNER
    IMAGE ANALYSIS
    IMAGING TECHNIQUES
    PIXELS
    SATELLITE OBSERVATION
    SATELLITE-BORNE PHOTOGRAPHY
    VEGETATIVE INDEX

SATELLITE INSTRUMENTS
0708 1410 3107 3502
GS   SPACECRAFT INSTRUMENTS
    #SATELLITE INSTRUMENTS
    ..MULTISPECTRAL LINEAR ARRAYS
RT   FLIGHT INSTRUMENTS
    % INSTRUMENTS

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# NASA THESAURUS HIERARCHICAL UPDATE

LASER ALTIMETERS  
 MEASURING INSTRUMENTS  
 NEEDS (DATA SYSTEM)  
 WILDLIFE RADIOLOCATION  
  
 SATELLITE INTERCEPTORS  
 0709 1109 3107 3502  
 RT % INTERCEPTORS  
 PURSUIT TRACKING  
  
 SATELLITE LAUNCHING  
 USE SPACECRAFT LAUNCHING  
  
 SATELLITE LIFETIME  
 3006 3107  
 GS LIFE (DURABILITY)  
 #SATELLITE LIFETIME  
 RT ORBIT DECAY  
 SPACECRAFT REENTRY  
  
 SATELLITE MANEUVERS  
 USE SPACECRAFT MANEUVERS  
  
 SATELLITE NAVIGATION SYSTEMS  
 2103 3502  
 GS #SATELLITE NAVIGATION SYSTEMS  
 .TRANSIT NAVIGATION SYSTEM  
 AUTONOMOUS NAVIGATION  
 GLOBAL POSITIONING SYSTEM  
 NAVIGATION SATELLITES  
 RADAR NAVIGATION  
 RADIO NAVIGATION  
 SATELLITE CONSTELLATIONS  
 SPACE NAVIGATION  
 % SYSTEMS  
  
 SATELLITE NETWORKS  
 0702 0708 0709 3107  
 SN (NETWORKS INCORPORATING SATELLITES)  
 GS #SATELLITE NETWORKS  
 .ARGOS SYSTEM  
 .SATELLITE CONSTELLATIONS  
 .VSAT (NETWORK)  
 AERONAUTICAL SATELLITES  
 AEROSAT SATELLITES  
 CODE DIVISION MULTIPLE ACCESS  
 COMMUNICATION NETWORKS  
 COMMUNICATION SATELLITES  
 COMSTAR SATELLITES  
 DEMAND ASSIGNMENT MULTIPLE ACCESS  
 DOMESTIC SATELLITE COMMUNICATIONS  
 SYSTEMS  
 HET EXPERIMENT  
 L-SAT  
 MARECS MARITIME SATELLITES  
  
 MILITARY SPACECRAFT  
 MOLNIYA SATELLITES  
 MULTIMISSION MODULAR SPACECRAFT  
 NAVIGATION SATELLITES  
 NAVSTAR SATELLITES  
 NETWORK CONTROL  
 % NETWORKS  
 SKYNET SATELLITES  
 TDR SATELLITES  
 TELECONFERENCING  
 TIME DIVISION MULTIPLE ACCESS  
  
 SATELLITE OBSERVATION  
 1308 2003 2004 3401 3407  
 GS OBSERVATION  
 .EARTH OBSERVATIONS (FROM SPACE)  
 .#SATELLITE OBSERVATION  
 RT ARC CLOUDS  
 EARTH RESOURCES PROGRAM  
 EROS (SATELLITES)  
 ESSA SATELLITES  
 FIRE (CLIMATOLOGY)  
 IRIS SATELLITES  
 ISCCP PROJECT  
 LANDSAT SATELLITES  
 METEOROLOGICAL SATELLITES  
 METEOSAT SATELLITE  
 NIMBUS PROJECT  
 NIMBUS SATELLITES  
 SATELLITE ALTIMETRY  
 SATELLITE IMAGERY  
 SIRS B SATELLITE  
 SPACEBORNE PHOTOGRAPHY  
 SWATH WIDTH  
 SYNCHRONOUS EARTH OBSERVATORY  
 SATELLITE  
 TIROS OPERATIONAL SATELLITE SYSTEM  
 TIROS SATELLITES  
 TOPEX  
 UHURU SATELLITE  
 VEGETATIVE INDEX  
 VELA SATELLITES  
 WILDLIFE RADIOLOCATION  
  
 SATELLITE ORBIT CALCULATION  
 USE ORBIT CALCULATION  
  
 SATELLITE ORBITS  
 1904 3006 3107 3502  
 SN (LIMITED TO ORBITS OF ARTIFICIAL  
 SATELLITES)  
 GS ORBITS  
 .SPACECRAFT ORBITS  
 .#SATELLITE ORBITS  
 ...GEOSYNCHRONOUS ORBITS  
  
 SATELLITE POWER TRANSMISSION  
 3107 3109  
 GS POWER BEAMING  
 #SATELLITE POWER TRANSMISSION  
 RT LASER POWER BEAMING  
 MICROWAVE POWER BEAMING  
 RECTENNAS  
 SOLAR ARRAYS  
 SOLAR CELLS  
 SOLAR POWER SATELLITES  
  
 SATELLITE RENDEZVOUS  
 USE ORBITAL RENDEZVOUS  
  
 SATELLITE REPAIR

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

REMOTE SENSORS  
SINGLE EVENT UPSETS  
SOLAR BACKSCATTER UV SPECTROMETER  
VISIBLE INFRARED SPIN SCAN  
RADIOMETER

RT ARTIFICIAL SATELLITES  
NATURAL SATELLITES

SATURABLE REACTORS  
2204

SATELLITE-BORNE PHOTOGRAPHY  
1407 1410 3107  
GS

UF SR (REACTORS)  
GS ELECTRIC REACTORS  
#SATURABLE REACTORS  
RT MAGNET COILS  
MAGNETIC AMPLIFIERS  
MAGNETIC CIRCUITS  
MAGNETIC CORES  
MAGNETIC SWITCHING  
POWER REACTORS  
TRANSFORMERS

RT  
..GAS GIANT PLANETS  
..#SATURN (PLANET)  
CASSINI MISSION  
DIONE  
ENCELADUS  
HYPERION  
IAPETUS  
JANUS  
MIMAS  
PHOEBE  
RHEA (ASTRONOMY)  
% SATURN  
TETHYS  
TITAN  
VOYAGER 2 SPACECRAFT

RT  
AERIAL PHOTOGRAPHY  
ASTRONOMICAL PHOTOGRAPHY  
BLACK AND WHITE PHOTOGRAPHY  
DMSP SATELLITES  
FOREST FIRE DETECTION  
GEOGRAPHIC APPLICATIONS PROGRAM  
INFRARED PHOTOGRAPHS  
MARS PHOTOGRAPHS  
PHOTOMAPPING  
PHOTOMAPS  
ROCKET-BORNE PHOTOGRAPHY  
SATELLITE IMAGERY  
SPACE SURVEILLANCE (SPACEBORNE)  
SPECTRAL RECONNAISSANCE  
TIMBER INVENTORY

SATURATED HYDROCARBONS  
USE ALKANES

% SATURATION  
0601 0603 2003 3407  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

SATURN  
3001  
GS

ENVIRONMENTS  
..EXTRATERRESTRIAL ENVIRONMENTS  
..PLANETARY ENVIRONMENTS  
...PLANETARY ATMOSPHERES  
...#SATURN ATMOSPHERE  
ATMOSPHERIC COMPOSITION  
PLANETARY IONOSPHERES  
PLANETARY RADIATION

SATELLITE-BORNE RADAR  
0705 0706 0707 1410 3107  
GS

SATURN D LAUNCH VEHICLE  
3103  
GS

LAUNCH VEHICLES  
..SATURN LAUNCH VEHICLES  
..#SATURN D LAUNCH VEHICLE  
ROCKET VEHICLES  
..MULTISTAGE ROCKET VEHICLES  
..SATURN LAUNCH VEHICLES  
..#SATURN D LAUNCH VEHICLE  
RL-10-A-3 ENGINE

SATURATION (CHEMISTRY)  
0601  
RT CHEMICAL BONDS  
% CHEMISTRY  
DEW POINT  
PRECIPITATION (CHEMISTRY)  
UNSATURATION (CHEMISTRY)

RT

SURVEILLANCE RADAR  
SYNTHETIC APERTURE RADAR  
TRACKING RADAR

SATURN  
3103  
GS

LAUNCH VEHICLES  
LAUNCH VEHICLES  
#SATURN LAUNCH VEHICLES  
..SATURN D LAUNCH VEHICLE  
..SATURN 1 LAUNCH VEHICLES  
...SATURN 1 SA-1 LAUNCH VEHICLE  
...SATURN 1 SA-2 LAUNCH VEHICLE  
...SATURN 1 SA-3 LAUNCH VEHICLE  
...SATURN 1 SA-4 LAUNCH VEHICLE  
...SATURN 1 SA-5 LAUNCH VEHICLE  
...SATURN 1 SA-6 LAUNCH VEHICLE  
...SATURN 1 SA-7 LAUNCH VEHICLE  
...SATURN 1 SA-8 LAUNCH VEHICLE  
...SATURN 1 SA-9 LAUNCH VEHICLE  
...SATURN 1 SA-10 LAUNCH VEHICLE  
..SATURN 1B LAUNCH VEHICLES

SATELLITE-TO-SATELLITE TRACKING  
3407  
GS

% SATURN  
3110 3409  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT SATURN (PLANET)  
SATURN PROJECT

LAUNCH VEHICLES  
#SATURN LAUNCH VEHICLES  
..SATURN D LAUNCH VEHICLE  
..SATURN 1 LAUNCH VEHICLES  
...SATURN 1 SA-1 LAUNCH VEHICLE  
...SATURN 1 SA-2 LAUNCH VEHICLE  
...SATURN 1 SA-3 LAUNCH VEHICLE  
...SATURN 1 SA-4 LAUNCH VEHICLE  
...SATURN 1 SA-5 LAUNCH VEHICLE  
...SATURN 1 SA-6 LAUNCH VEHICLE  
...SATURN 1 SA-7 LAUNCH VEHICLE  
...SATURN 1 SA-8 LAUNCH VEHICLE  
...SATURN 1 SA-9 LAUNCH VEHICLE  
...SATURN 1 SA-10 LAUNCH VEHICLE  
..SATURN 1B LAUNCH VEHICLES

% SATELLITES  
1901 2004  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

SATURN (PLANET)  
3001 3008  
GS CELESTIAL BODIES  
..PLANETS

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

...SATURN 1 SA-7 LAUNCH VEHICLE  
 ...SATURN 1 SA-8 LAUNCH VEHICLE  
 ...SATURN 1 SA-9 LAUNCH VEHICLE  
 ...SATURN 1 SA-10 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..#SATURN 1 LAUNCH VEHICLES  
 ....SATURN 1 SA-1 LAUNCH VEHICLE  
 ....SATURN 1 SA-2 LAUNCH VEHICLE  
 ....SATURN 1 SA-3 LAUNCH VEHICLE  
 ....SATURN 1 SA-4 LAUNCH VEHICLE  
 ....SATURN 1 SA-5 LAUNCH VEHICLE  
 ....SATURN 1 SA-6 LAUNCH VEHICLE  
 ....SATURN 1 SA-7 LAUNCH VEHICLE  
 ....SATURN 1 SA-8 LAUNCH VEHICLE  
 ....SATURN 1 SA-9 LAUNCH VEHICLE  
 ....SATURN 1 SA-10 LAUNCH VEHICLE  
 H-1 ENGINE  
 M-1 ENGINE

RT

SATURN 1 SA-1 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-1 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-1 LAUNCH VEHICLE

SATURN 1 SA-2 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-2 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-2 LAUNCH VEHICLE

SATURN 1 SA-3 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-3 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES

...#SATURN 1 SA-3 LAUNCH VEHICLE  
 SATURN 1 SA-4 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-4 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-4 LAUNCH VEHICLE

SATURN 1 SA-5 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-5 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-5 LAUNCH VEHICLE

SATURN 1 SA-6 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-6 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-6 LAUNCH VEHICLE

SATURN 1 SA-7 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-7 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-7 LAUNCH VEHICLE

SATURN 1 SA-8 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES

...#SATURN 1 SA-8 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-8 LAUNCH VEHICLE

SATURN 1 SA-9 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-9 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-9 LAUNCH VEHICLE

SATURN 1 SA-10 LAUNCH VEHICLE  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-10 LAUNCH VEHICLE  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ...SATURN 1 LAUNCH VEHICLES  
 ...#SATURN 1 SA-10 LAUNCH VEHICLE

SATURN 1 WORKSHOP  
 3109  
 GS  
 ARTIFICIAL SATELLITES  
 .ORBITAL WORKSHOPS  
 ..SATURN WORKSHOPS  
 ...#SATURN 1 WORKSHOP  
 MANNED SPACECRAFT  
 .ORBITAL WORKSHOPS  
 ..SATURN WORKSHOPS  
 ...#SATURN 1 WORKSHOP  
 AIRLOCK MODULES  
 APOLLO APPLICATIONS PROGRAM  
 APOLLO PROJECT  
 MULTIPLE DOCKING ADAPTERS  
 SKYLAB PROGRAM  
 SPACE STATIONS

SATURN 1B LAUNCH VEHICLES  
 3103  
 GS  
 LAUNCH VEHICLES  
 .SATURN LAUNCH VEHICLES  
 ..#SATURN 1B LAUNCH VEHICLES  
 ROCKET VEHICLES  
 .MULTISTAGE ROCKET VEHICLES

```
..SATURN LAUNCH VEHICLES
..#SATURN 1B LAUNCH VEHICLES
RT
H-1 ENGINE
J-2 ENGINE
M-1 ENGINE
SKYLAB 2
SKYLAB 3
SKYLAB 4

SATURN 2 LAUNCH VEHICLES
3103
GS
LAUNCH VEHICLES
.SATURN LAUNCH VEHICLES
.SATURN 2 LAUNCH VEHICLES
ROCKET VEHICLES
.MULTISTAGE ROCKET VEHICLES
..SATURN LAUNCH VEHICLES
..#SATURN 2 LAUNCH VEHICLES

SATURN 5 LAUNCH VEHICLES
3103
GS
LAUNCH VEHICLES
.SATURN LAUNCH VEHICLES
.SATURN 5 LAUNCH VEHICLES
ROCKET VEHICLES
.MULTISTAGE ROCKET VEHICLES
..SATURN LAUNCH VEHICLES
..#SATURN 5 LAUNCH VEHICLES
J-2 ENGINE
SKYLAB 2
SKYLAB 3
SKYLAB 4

SATURN 5 WORKSHOP
3109
GS
ARTIFICIAL SATELLITES
.ORBITAL WORKSHOPS
..SATURN WORKSHOPS
..#SATURN 5 WORKSHOP
MANNED SPACECRAFT
.ORBITAL WORKSHOPS
..SATURN WORKSHOPS
..#SATURN 5 WORKSHOP
AIRLOCK MODULES
APOLLO APPLICATIONS PROGRAM
APOLLO PROJECT
MULTIPLE DOCKING ADAPTERS
SKYLAB PROGRAM
SPACE STATIONS

SAUDI ARABIA
1305
GS
NATIONS
#SAUDI ARABIA
RT
ASIA

..SATURN LAUNCH VEHICLES
..#SATURN 1B LAUNCH VEHICLES
RT
H-1 ENGINE
J-2 ENGINE
M-1 ENGINE
SKYLAB 2
SKYLAB 3
SKYLAB 4

SATURN 2 LAUNCH VEHICLES
3103
GS
LAUNCH VEHICLES
.SATURN LAUNCH VEHICLES
.SATURN 2 LAUNCH VEHICLES
ROCKET VEHICLES
.MULTISTAGE ROCKET VEHICLES
..SATURN LAUNCH VEHICLES
..#SATURN 2 LAUNCH VEHICLES

SATURN 5 LAUNCH VEHICLES
3103
GS
LAUNCH VEHICLES
.SATURN LAUNCH VEHICLES
.SATURN 5 LAUNCH VEHICLES
ROCKET VEHICLES
.MULTISTAGE ROCKET VEHICLES
..SATURN LAUNCH VEHICLES
..#SATURN 5 LAUNCH VEHICLES
J-2 ENGINE
SKYLAB 2
SKYLAB 3
SKYLAB 4

SATURN 5 WORKSHOP
3109
GS
ARTIFICIAL SATELLITES
.ORBITAL WORKSHOPS
..SATURN WORKSHOPS
..#SATURN 5 WORKSHOP
MANNED SPACECRAFT
.ORBITAL WORKSHOPS
..SATURN WORKSHOPS
..#SATURN 5 WORKSHOP
AIRLOCK MODULES
APOLLO APPLICATIONS PROGRAM
APOLLO PROJECT
MULTIPLE DOCKING ADAPTERS
SKYLAB PROGRAM
SPACE STATIONS

SAUDI ARABIA
1305
GS
NATIONS
#SAUDI ARABIA
RT
ASIA

SAUDI ARABIAN SPACE PROGRAM
SAUDI ARABIAN SPACE PROGRAM
3409 3009
GS
PROGRAMS
.SPACE PROGRAMS
..SAUDI ARABIAN SPACE PROGRAM
RT
ARABSAT
ARCOMSAT
SAUDI ARABIA
SPACE SHUTTLE MISSION 51-G

SAVAGE AIRCRAFT
USE A-2 AIRCRAFT

SAVANNAH NUCLEAR SHIP
2201 2202 3401
GS
SURFACE VEHICLES
.CARGO SHIPS
..SAVANNAH NUCLEAR SHIP
.NUCLEAR POWERED SHIPS
..SAVANNAH NUCLEAR SHIP
WATER VEHICLES
.SHIPS
..CARGO SHIPS
..#SAVANNAH NUCLEAR SHIP
.NUCLEAR POWERED SHIPS
..SAVANNAH NUCLEAR SHIP
MARINE PROPULSION
NUCLEAR PROPULSION

SAVANNAHS
USE GRASSLANDS

SAWS
1504
GS
CUTTERS
#SAWS
TOOLS
#SAWS
RT
MACHINE TOOLS
SHEARS

SAWTOOTH WAVEFORMS
0702 0710 1002 1202 2311
GS
WAVEFORMS
#SAWTOOTH WAVEFORMS
RT
PULSE AMPLITUDE
PULSE DURATION
SQUARE WAVES

SC-1 AIRCRAFT
0201
UF
SHORT SC-1 AIRCRAFT
SKYVAN AIRCRAFT
TURBO-SKYVAN AIRCRAFT
LIGHT AIRCRAFT
#SC-7 AIRCRAFT
MONOPLANES
#SC-7 AIRCRAFT
TRANSPORT AIRCRAFT
#SC-7 AIRCRAFT
CARGO AIRCRAFT
PASSENGER AIRCRAFT

SCALAR MAGNETIC CHARGE DENSITY
USE MAGNETIC CHARGE DENSITY

SCALARS
1902 2311
RT
TENSOR ANALYSIS
TENSORS

% SCALE
1406 1408 1702 1902 3501
SN
(USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT
SCALE (CORROSION)
```

# NASA THESAURUS HIERARCHICAL UPDATE

SCALE (RATIO)  
TEMPERATURE SCALES  
WEIGHT INDICATORS

SCALE (CORROSION)  
1702

GS CORROSION  
RT #SCALE (CORROSION)  
CHEMICAL ATTACK  
DEGRADATION  
HOT CORROSION  
PICKLING (METALLURGY)  
RUSTING  
% SCALE  
% SCALING

SCALE (RATIO)  
1902

GS RATIOS  
RT #SCALE (RATIO)  
MAPPING  
RETICLES  
% SCALE

SCALE EFFECT  
1202 1203

RT % EFFECTS  
FORCE DISTRIBUTION  
PARAMETERIZATION  
REYNOLDS NUMBER  
% SCALING

SCALE HEIGHT  
1301 1302 1408

GS DIMENSIONS  
HEIGHT

RT #SCALE HEIGHT  
EARTH ATMOSPHERE  
GEOPOTENTIAL HEIGHT  
HEAD (FLUID MECHANICS)

SCALE MODELS  
0101 0201 3009

GS MODELS  
RT #SCALE MODELS  
AERODYNAMIC CONFIGURATIONS  
AIRCRAFT MODELS  
REYNOLDS EQUATION  
SCALING LAWS  
SEMISPAN MODELS  
SIMILARITY THEOREM  
SIMILITUDE LAW  
SPACECRAFT MODELS  
WIND TUNNEL MODELS

SCALERS

0801 0902 0905 1409 3110  
GS CIRCUITS  
.COUNTING CIRCUITS  
RT #SCALERS  
TENSOR ANALYSIS

% SCALING

0802 1303 1406 3501  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT CALIBRATING  
ERRORS  
SCALE (CORROSION)  
SCALE EFFECT  
SCALING LAWS

SCALING LAWS

1902 3203  
GS LAWS  
RT #SCALING LAWS  
DIMENSIONAL ANALYSIS  
DIMENSIONLESS NUMBERS  
SCALE MODELS  
% SCALING  
SIMILARITY NUMBERS  
WIND TUNNEL CALIBRATION

SCALLOPING

3407  
RT EDGES  
ELECTRON BEAMS  
TRAVELING WAVE TUBES

SCANDINAVIA

1305  
RT DENMARK  
FINLAND  
NORWAY  
SWEDEN

SCANDIUM

1703  
GS CHEMICAL ELEMENTS  
.RARE EARTH ELEMENTS  
RT #SCANDIUM  
...SCANDIUM ISOTOPES  
METALS  
.RARE EARTH ELEMENTS  
...SCANDIUM  
...SCANDIUM ISOTOPES  
.TRANSITION METALS  
#SCANDIUM

...SCANDIUM ISOTOPES

SCANDIUM COMPOUNDS

0603 1804  
GS RARE EARTH COMPOUNDS  
#SCANDIUM COMPOUNDS  
..SCANDIUM OXIDES  
RT % CHEMICAL COMPOUNDS  
% GROUP 3B COMPOUNDS  
% METAL COMPOUNDS

SCANDIUM ISOTOPES

1703 2406  
UF SCANDIUM 46  
GS CHEMICAL ELEMENTS  
.NUCLIDES  
..ISOTOPES  
..#SCANDIUM ISOTOPES  
.RARE EARTH ELEMENTS  
..SCANDIUM  
..#SCANDIUM ISOTOPES  
METALS  
.RARE EARTH ELEMENTS  
..SCANDIUM  
..#SCANDIUM ISOTOPES  
.TRANSITION METALS  
..SCANDIUM  
..#SCANDIUM ISOTOPES

SCANDIUM OXIDES

0603 1804  
GS CHALCOGENIDES  
.OXIDES  
..METAL OXIDES  
..#SCANDIUM OXIDES  
RARE EARTH COMPOUNDS  
.SCANDIUM COMPOUNDS  
#SCANDIUM OXIDES

SCANDIUM 46

USE SCANDIUM ISOTOPES

SCANNER PROJECT

3409  
GS PROGRAMS  
.PROJECTS  
RT #SCANNER PROJECT  
HORIZON SCANNERS  
INFRARED SCANNERS  
OPTICAL EQUIPMENT

SCANNERS

0705 0801 0901 0905 1404 1409  
UF SCANNING DEVICES  
GS #SCANNERS

|                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| .COASTAL ZONE COLOR SCANNER<br>.HORIZON SCANNERS<br>.INFRARED SCANNERS<br>.OCEAN COLOR SCANNER<br>.OPTICAL SCANNERS<br>..FLYING SPOT SCANNERS<br>...MULTISPECTRAL BAND SCANNERS<br>...THEMATIC MAPPERS (LANDSAT)<br>.ULTRASONIC SCANNERS<br>.CONICAL SCANNING<br>OPTICAL DATA PROCESSING<br>OPTICAL EQUIPMENT<br>PANORAMIC SCANNING<br>READING<br>SCANNING<br>SUBREFLECTORS | SCANNING LASER ACOUSTIC MICROSCOPE (SLAM)<br>USE ACOUSTIC MICROSCOPES<br>SCANNING TUNNELING MICROSCOPY<br>1406<br>GS MICROSCOPY<br>.ELECTRON MICROSCOPY<br>.#SCANNING TUNNELING MICROSCOPY<br>RT ELECTRON MICROSCOPES<br>ELECTRON TUNNELING<br>TRANSMISSION ELECTRON MICROSCOPY      | RT % CHARGING<br>ELECTRIC CHARGE<br>ELECTROMAGNETIC INTERFERENCE<br>ELECTROSTATIC CHARGE<br>ELECTROSTATIC PROBES<br>ELECTROSTATIC SHIELDING<br>HIGH ENERGY ELECTRONS                                                                                                                                                                                                                                                          |
| RT<br>.CONICAL SCANNING<br>OPTICAL EQUIPMENT<br>PANORAMIC SCANNING<br>READING<br>SCANNING<br>SUBREFLECTORS                                                                                                                                                                                                                                                                  | SCATTER PLATES (OPTICS)<br>0602<br>GS OPTICAL EQUIPMENT<br>#SCATTER PLATES (OPTICS)<br>RT BEAM SPLITTERS<br>COHERENT LIGHT<br>HOLOGRAPHIC INTERFEROMETRY<br>HOLOGRAPHY<br>INTERFEROMETRY<br>LIGHT SCATTERING<br>% OPTICS<br>% PLATES<br>SPECKLE HOLOGRAPHY<br>SPECKLE INTERFEROMETRY | SCATTER PLATES (OPTICS)<br>0602<br>GS OPTICAL EQUIPMENT<br>#SCATTER PLATES (OPTICS)<br>RT BEAM SPLITTERS<br>COHERENT LIGHT<br>HOLOGRAPHIC INTERFEROMETRY<br>HOLOGRAPHY<br>INTERFEROMETRY<br>LIGHT SCATTERING<br>% OPTICS<br>% PLATES<br>SPECKLE HOLOGRAPHY<br>SPECKLE INTERFEROMETRY                                                                                                                                          |
| SCANNING<br>0705 0802 3407<br>GS #SCANNING<br>.CONICAL SCANNING<br>.FREQUENCY SCANNING<br>.PANORAMIC SCANNING<br>.RADAR SCANNING<br>.RASTER SCANNING<br>EARTH RESOURCES<br>EROS (SATELLITES)<br>EXAMINATION<br>MONITORS<br>MULTISPECTRAL BAND SCANNERS<br>RAPID BALLISTICS IDENTIFICATION<br>READING<br>SCANNERS<br>SEARCHING<br>SURVEILLANCE<br>ULTRASONIC SCANNERS        | SCAR PROGRAM<br>USE SUPERSONIC CRUISE AIRCRAFT RESEARCH<br>SCARFING<br>0603 1504 1704<br>GS CUTTING<br>#SCARFING<br>RT CLEANING<br>GRINDING (MATERIAL REMOVAL)<br>METAL CUTTING<br>SLICING                                                                                           | SCATTER PROPAGATION<br>0710 2309 2402<br>GS TRANSMISSION<br>.ELECTROMAGNETIC WAVE TRANSMISSION<br>.#SCATTER PROPAGATION<br>... IONOSPHERIC F-SCATTER<br>PROPAGATION<br>.WAVE PROPAGATION<br>.#SCATTER PROPAGATION<br>... IONOSPHERIC F-SCATTER<br>PROPAGATION<br>BACKSCATTERING<br>FORWARD SCATTERING<br>IONOSPHERIC PROPAGATION<br>METEOR TRAILS<br>RADIO RECEPTION<br>RADIO SCATTERING<br>RADIO TRANSMISSION<br>RADIO WAVES |
| SCANNING DEVICES<br>USE SCANNERS                                                                                                                                                                                                                                                                                                                                            | SCARPS<br>USE ESCARPMENTS<br>SCARS<br>0404<br>GS TISSUES (BIOLOGY)<br>#SCARS                                                                                                                                                                                                         | RT<br>BACKSCATTERING<br>FORWARD SCATTERING<br>IONOSPHERIC PROPAGATION<br>METEOR TRAILS<br>RADIO RECEPTION<br>RADIO SCATTERING<br>RADIO TRANSMISSION<br>RADIO WAVES                                                                                                                                                                                                                                                            |
| SCANNING ELECTRON MICROSCOPY<br>1406<br>UF SEM (MICROSCOPY)<br>GS MICROSCOPY<br>.ELECTRON MICROSCOPY<br>.#SCANNING ELECTRON MICROSCOPY<br>ELECTRON BEAMS<br>ELECTRON MICROSCOPES<br>FIELD EMISSION<br>ION MICROSCOPES<br>MAGNETIC LENSES<br>MICROANALYSIS<br>PHASE CONTRAST<br>SECONDARY EMISSION                                                                           | SCAT<br>USE SUPERSONIC COMMERCIAL AIR TRANSPORT<br>SCATHA SATELLITE<br>3107<br>UF P78-2 SATELLITE<br>SPACECRAFT CHARGING AT HIGH<br>ALTITUDE<br>GS ARTIFICIAL SATELLITES<br>.SCIENTIFIC SATELLITES<br>.#SCATHA SATELLITE                                                             | SCATTERERS<br>USE SCATTERING<br>SCATTERING<br>0710 2301 2310 2311 3407<br>UF SCATTERERS<br>GS #SCATTERING<br>.BACKSCATTERING<br>.COHERENT SCATTERING<br>.COMPTON EFFECT<br>.ELASTIC SCATTERING<br>.ELECTRON SCATTERING                                                                                                                                                                                                        |



# NASA THESAURUS HIERARCHICAL UPDATE

..ELECTRON RUNAWAY (PLASMA PHYSICS)

.FORWARD SCATTERING  
 .INCOHERENT SCATTERING  
 .INELASTIC SCATTERING  
 .INVERSE SCATTERING  
 .ION SCATTERING  
 .NUCLEAR SCATTERING  
 ..NEUTRON SCATTERING  
 ..RESONANCE SCATTERING  
 ..NUCLEON-NUCLEON SCATTERING  
 .PROTON SCATTERING  
 .RADAR SCATTERING  
 .WAVE SCATTERING  
 ..ACOUSTIC SCATTERING  
 ...REVERBERATION  
 ...ATMOSPHERIC SCATTERING  
 ...TROPOSPHERIC SCATTERING  
 ...ELECTROMAGNETIC SCATTERING  
 ...IONOSPHERIC F-SCATTER  
 PROPAGATION

...LIGHT SCATTERING

....HALOS  
 ...MICROWAVE SCATTERING  
 ...MIE SCATTERING  
 ...RAYLEIGH SCATTERING  
 ...RAMAN SPECTRA  
 ...THOMSON SCATTERING  
 ...X RAY SCATTERING  
 ATOMIC COLLISIONS  
 BISTATIC REFLECTIVITY  
 CIRCUMSOLAR RADIATION  
 COLLISION PARAMETERS  
 COLLISIONS  
 DEEP SCATTERING LAYERS  
 DEFLECTION  
 DIFFUSION

DISPERSING  
 ELECTROMAGNETIC RADIATION  
 ENCOUNTERS  
 HUYGENS PRINCIPLE  
 IMPINGEMENT  
 INCIDENT RADIATION  
 INELASTIC COLLISIONS  
 MEAN FREE PATH  
 PARTICLE COLLISIONS  
 POMERONS  
 REFLECTION  
 RELEASING  
 SCATTEROMETERS  
 SHOCK WAVE INTERACTION  
 SPREAD REFLECTION  
 SPREADING  
 SPRINKLING  
 STATISTICAL DISTRIBUTIONS  
 TRANSMITTANCE

WAVE DEGRADATION  
 WAVE DISPERSION  
 WAVE INTERACTION

SCATTERING AMPLITUDE  
 O710 1002 2309 2402  
 GS AMPLITUDES  
 #SCATTERING AMPLITUDE  
 RT FADDEEV EQUATIONS  
 MANDELSTAM REPRESENTATION  
 WAVE SCATTERING

SCATTERING COEFFICIENTS  
 O710 1406 2306 2309 2402 3501  
 GS COEFFICIENTS  
 #SCATTERING COEFFICIENTS  
 RT ABSORPTIVITY  
 ATTENUATION COEFFICIENTS  
 FORM FACTORS

SCATTERING CROSS SECTIONS  
 O710 2306 2309 2402  
 RT ABSORPTION CROSS SECTIONS  
 BARYON RESONANCE  
 BORN APPROXIMATION  
 % CROSS SECTIONS  
 ELECTRON RUNAWAY (PLASMA PHYSICS)  
 IONIZATION CROSS SECTIONS  
 NEUTRON CROSS SECTIONS  
 POMERANCHUK THEOREM  
 POMERONS  
 RAMSAUER EFFECT  
 REGGE POLES  
 S MATRIX THEORY  
 STOPPING POWER

SCATTERING FUNCTIONS  
 O710 1406 2306 2309 2402 3501  
 RT FLUX DENSITY  
 % FUNCTIONS  
 RADIANT FLUX DENSITY

SCATTERING MATRIX  
 USE S MATRIX THEORY

SCATTEROMETERS  
 O710 2309 2402  
 GS MEASURING INSTRUMENTS  
 #SCATTEROMETERS  
 RT % INSTRUMENTS  
 MICROWAVE SCATTERING  
 MICROWAVES  
 RADAR  
 RADAR SCATTERING  
 SCATTERING

WAVE SCATTERING

SCAVENGING  
 O403 0411 0602 0603 3404  
 RT CLEANING  
 DEOASSING  
 DEOXIDIZING  
 PURIFICATION

SCCF  
 USE SOLAR CELL CALIBRATION FACILITY

SCENE ANALYSIS  
 O802 2306 2310 2402  
 GS DATA PROCESSING  
 .OPTICAL DATA PROCESSING  
 .#SCENE ANALYSIS  
 RT CHANGE DETECTION  
 CHARACTER RECOGNITION  
 EDGE DETECTION  
 FEATURE IDENTIFICATION AND  
 LOCATION EXPR  
 IMAGE ANALYSIS  
 IMAGERY  
 IMAGING TECHNIQUES  
 OPTICAL FLOW (IMAGE ANALYSIS)  
 VIDEO LANDMARK ACQUISITION AND  
 TRACKING

SCENEDESMUS  
 O407 0409  
 GS PLANTS (BOTANY)  
 .ALGAE  
 .#SCENEDESMUS

SCF  
 USE SELF CONSISTENT FIELDS  
 SCHACH EFFECT  
 1901  
 RT CELESTIAL MECHANICS  
 % EFFECTS  
 ORBIT PERTURBATION  
 PERTURBATION  
 SATELLITE PERTURBATION

SCHAUDER FIXPOINT THEOREM  
 1902  
 GS THEOREMS  
 #SCHAUDER FIXPOINT THEOREM  
 RT COMPLEX VARIABLES  
 DIFFERENTIAL EQUATIONS

SCHEDULES  
 3406 3409 4001

GS #SCHEDULES  
 .COUNTDOWN  
 RT CONTRACT MANAGEMENT  
 PRECISION  
 PREDICTIONS  
 PRODUCTION PLANNING  
 TIME  
 TIME LAG  
 TURNAROUND (STS)  
  
 SCHEDULING  
 3406 3407 4001  
 GS #SCHEDULING  
 .PREDICTION ANALYSIS TECHNIQUES  
 RT CALENDARS  
 CONSECUTIVE EVENTS  
 CONTINUITY  
 % CONTROL  
 CROP CALENDARS  
 DECISION THEORY  
 FORECASTING  
 FORMALISM  
 LATENESS  
 MATHEMATICAL MODELS  
 MATRIX MANAGEMENT  
 MISSION PLANNING  
 OPTIMIZATION  
 PRODUCTION ENGINEERING  
 QUALITY CONTROL  
 SEQUENCING  
 TASK COMPLEXITY  
 TASK PLANNING (ROBOTICS)  
 TASKS  
 TIME SERIES ANALYSIS  
  
 SCHEELITE  
 1806  
 GS CALCIUM COMPOUNDS  
 #SCHEELITE  
 CHALCOGENIDES  
 .OXIDES  
 .METAL OXIDES  
 ...TUNGSTEN OXIDES  
 ...#SCHEELITE  
 MINERALS  
 #SCHEELITE  
 TUNGSTEN COMPOUNDS  
 .TUNGSTEN OXIDES  
 .#SCHEELITE  
  
 SCHELKUNDOFF PRINCIPLE  
 0901 1002 2402  
 RT ANTENNA RADIATION PATTERNS  
 HORN ANTENNAS  
 HUYGENS PRINCIPLE  
  
 REFLECTOMETERS  
 REFLECTORS  
  
 SCHEMATICS  
 USE CIRCUIT DIAGRAMS  
  
 SCHIFF BASES  
 USE IMINES  
  
 SCHIST  
 1805 1806  
 1305  
 GS ROCKS  
 #SCHIST  
 RT LIMESTONE  
 SANDSTONES  
  
 SCHIZOPHRENIA  
 0408 0410  
 GS PSYCHOSES  
 #SCHIZOPHRENIA  
 RT % DEPRESSION  
 IRRATIONALITY  
 MENTAL HEALTH  
  
 SCHLEICHER AIRCRAFT  
 0201  
 RT % AIRCRAFT  
 GLIDERS  
  
 SCHLEICHER KA-6 SAILPLANE  
 USE KA-6 SAILPLANES  
  
 SCHLIEREN PHOTOGRAPHY  
 1201 1202 1203 1407 2310 3501  
 GS IMAGERY  
 .SHADOWGRAPH PHOTOGRAPHY  
 .#SCHLIEREN PHOTOGRAPHY  
 PHOTOGRAPHY  
 .SHADOWGRAPH PHOTOGRAPHY  
 .#SCHLIEREN PHOTOGRAPHY  
 BLACK AND WHITE PHOTOGRAPHY  
 DIFFERENTIAL INTERFEROMETRY  
 FLOW VISUALIZATION  
 MACH-ZEHNDER INTERFEROMETERS  
 MOIRE EFFECTS  
  
 SCHMIDT CAMERAS  
 1412 2310 3009  
 GS OPTICAL EQUIPMENT  
 .CAMERAS  
 .#SCHMIDT CAMERAS  
 PHOTOGRAPHIC EQUIPMENT  
 .CAMERAS  
 .#SCHMIDT CAMERAS  
 ASTRONOMICAL PHOTOGRAPHY  
 RT  
  
 SCHMIDT METHOD  
 1902  
 RT DIFFERENTIAL EQUATIONS  
 INTEGRAL EQUATIONS  
 % METHODOLOGY  
 REAL VARIABLES  
  
 SCHMIDT NUMBER  
 1902  
 GS RATIOS  
 .DIMENSIONLESS NUMBERS  
 .#SCHMIDT NUMBER  
 RT NUSSELT NUMBER  
 PRANDTL NUMBER  
  
 SCHMIDT TELESCOPES  
 1412 3001  
 GS TELESCOPES  
 #SCHMIDT TELESCOPES  
 RT REFLECTING TELESCOPES  
  
 SCHOOLS  
 0502 3406  
 RT EDUCATION  
 INSTRUCTORS  
 TRAINING EVALUATION  
 UNIVERSITIES  
  
 SCHOOLS (FISH)  
 0402 1310  
 GS ANIMALS  
 .VERTEBRATES  
 ..FISHES  
 ..#SCHOOLS (FISH)  
 RT FISHING  
 ICHTHYOLOGY  
  
 SCHOTTKY BARRIER DIODES  
 USE SCHOTTKY DIODES  
  
 SCHOTTKY DIODES  
 0903 0906  
 UF SCHOTTKY BARRIER DIODES  
 GS ELECTRONIC EQUIPMENT  
 .DIODES  
 ..SEMICONDUCTOR DIODES  
 ..#SCHOTTKY DIODES  
 .SOLID STATE DEVICES  
 ..SEMICONDUCTOR DEVICES  
 ..#SCHOTTKY DIODES  
 RT % BARRIERS  
 BARRITT DIODES

# NASA THESAURUS HIERARCHICAL UPDATE

GALLIUM ARSENIDES  
MSM (SEMICONDUCTORS)  
N-TYPE SEMICONDUCTORS  
SEMICONDUCTOR JUNCTIONS  
SILICON  
SIS (SEMICONDUCTORS)  
WORK FUNCTIONS  
ZINC SELENIDES

SCHOTTKY EFFECT  
USE WORK FUNCTIONS

SCHREIBERSITE  
1806 3005  
GS  
IRON COMPOUNDS  
#SCHREIBERSITE  
MINERALS  
#SCHREIBERSITE  
NICKEL COMPOUNDS  
#SCHREIBERSITE  
PHOSPHORUS COMPOUNDS  
PHOSPHIDES  
#SCHREIBERSITE  
IRON METEORITES  
METEORITIC COMPOSITION  
STONY METEORITES

SCHROEDINGER EQUATION  
1902 2309 2402  
GS  
WAVE EQUATIONS  
#SCHROEDINGER EQUATION  
RT % EQUATIONS  
WENTZEL-KRAMER-BRILLOUIN METHOD

SCHULER TUNING  
0101 1403 2102 2308  
GS  
TUNING  
#SCHULER TUNING  
RT  
GYROSCOPIC PENDULUMS  
GYROSCOPIC STABILITY  
INERTIAL NAVIGATION

SCHUMANN-RUNGE BANDS  
1411 2402  
GS  
SPECTRA  
#SPECTRAL BANDS  
#SCHUMANN-RUNGE BANDS  
RT  
% BANDS  
ABSORPTION SPECTRA  
EMISSION SPECTRA  
HERZBERG BANDS  
OXYGEN  
QUANTUM THEORY

SCHWARTZ INEQUALITY

1902  
GS  
INEQUALITIES  
#SCHWARTZ INEQUALITY  
RT  
ALGEBRA  
LINEAR TRANSFORMATIONS  
VECTORS (MATHEMATICS)  
SCHWARTZ METHOD  
1902 3501  
GS  
ANALYSIS (MATHEMATICS)  
#NUMERICAL ANALYSIS  
#APPROXIMATION  
#SCHWARTZ METHOD  
STRESS ANALYSIS  
#SCHWARTZ METHOD  
RT % METHODOLOGY

SCHWARZ-CHRISTOFFEL TRANSFORMATION  
1902  
GS  
ANALYSIS (MATHEMATICS)  
#COMPLEX VARIABLES  
#SCHWARZ-CHRISTOFFEL  
TRANSFORMATION  
FUNCTIONS (MATHEMATICS)  
#SCHWARZ-CHRISTOFFEL TRANSFORMATION  
RT  
CONFORMAL MAPPING

SCHWARZSCHILD ANTENNAS  
0701 0705 0901 0904  
GS  
ANTENNAS  
#SCHWARZSCHILD ANTENNAS  
RT  
HORNS  
PARABOLIC REFLECTORS  
RADAR ANTENNAS  
RADIO ANTENNAS

SCHWARZSCHILD METRIC  
2307 2402 3001  
RT  
BIMETRIC THEORIES  
COORDINATE TRANSFORMATIONS  
ESCAPE VELOCITY  
EVENT HORIZON  
GRAVITATIONAL FIELDS  
IONIZATION  
LIGHT SPEED  
ORBITALS  
ORBITS  
RELATIVITY

SCHWASSMANN-WACHMANN COMET  
3001 3005  
GS  
CELESTIAL BODIES  
#COMETS  
#SCHWASSMANN-WACHMANN COMET  
RT  
SOLAR SYSTEM

SCIATIC REGION  
0404  
GS  
ANATOMY  
#SCIATIC REGION  
REGIONS  
#SCIATIC REGION  
HUMAN BODY  
RT  
LUMBAR REGION  
MUSCULOSKELETAL SYSTEM  
NERVES  
SPINE  
% SCIENCE  
3406  
SN

(USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT  
ACOUSTICS  
AEROACOUSTICS  
AERODYNAMICS  
%  
AERONAUTICS  
AEROSPACE MEDICINE  
AEROTHERMODYNAMICS  
ALGEBRA  
ANTHOPOLOGY  
ASTRODYNAMICS  
ASTRONOMY  
ASTROPHYSICS  
ATMOSPHERIC PHYSICS  
ATOMIC PHYSICS  
BIOACOUSTICS  
BIOASTRONAUTICS  
BIODYNAMICS  
% BIOLOGY  
BIOPHYSICS  
BOTANY  
CLOUD PHYSICS  
COMBUSTION PHYSICS  
COMPUTATIONAL ASTROPHYSICS  
ELECTROPHYSICS  
ELECTROPHYSIOLOGY  
ENTOMOLOGY  
FLUID DYNAMICS  
FLUID MECHANICS  
GEOLOGY  
GEOMETRY  
GEOPHYSICS  
HEALTH PHYSICS  
HELIOSEISMOLOGY  
HYDROGEOLOGY  
HYDROMECHANICS  
LIFE SCIENCES  
LOW TEMPERATURE PHYSICS  
MARINE BIOLOGY

|                               |                                      |                                  |
|-------------------------------|--------------------------------------|----------------------------------|
| MARINE CHEMISTRY              | FACILITY                             | ...EXPLORER 23 SATELLITE         |
| MARINE METEOROLOGY            | ...TENMA SATELLITE                   | ...EXPLORER 24 SATELLITE         |
| MATERIALS SCIENCE             | ...X RAY ASTROPHYSICS FACILITY       | ...EXPLORER 25 SATELLITE         |
| % MATHEMATICS                 | ...ATS                               | ...EXPLORER 26 SATELLITE         |
| % MECHANICS (PHYSICS)         | ...ATS 1                             | ...EXPLORER 27 SATELLITE         |
| % MEDICAL SCIENCE             | ...ATS 2                             | ...EXPLORER 28 SATELLITE         |
| % METALLURGY                  | ...ATS 3                             | ...EXPLORER 29 SATELLITE         |
| METEOROLOGY                   | ...ATS 4                             | ...EXPLORER 30 SATELLITE         |
| % MOLECULAR PHYSICS           | ...ATS 5                             | ...EXPLORER 31 SATELLITE         |
| NEUTRON PHYSICS               | ...ATS 6                             | ...EXPLORER 32 SATELLITE         |
| NUCLEAR PHYSICS               | ...ATS 7                             | ...EXPLORER 33 SATELLITE         |
| OCEANOGRAPHY                  | ...ATS 8                             | ...EXPLORER 34 SATELLITE         |
| % OPTICS                      | ...AZUR SATELLITE                    | ...EXPLORER 35 SATELLITE         |
| % PHYSICAL SCIENCES           | ...CANNONBALL 2 SATELLITE            | ...EXPLORER 36 SATELLITE         |
| % PHYSICS                     | ...CRRES (SATELLITE)                 | ...EXPLORER 37 SATELLITE         |
| PHYSIOCHEMISTRY               | ...DIAL SATELLITE                    | ...EXPLORER 38 SATELLITE         |
| PHYSIOLOGY                    | ...ENVIRONMENTAL RESEARCH SATELLITES | ...EXPLORER 39 SATELLITE         |
| PLASMA PHYSICS                | ...ERS 17                            | ...EXPLORER 40 SATELLITE         |
| POLYMER PHYSICS               | ...ERS 18                            | ...EXPLORER 41 SATELLITE         |
| PSYCHOPHYSICS                 | ...INTASAT SATELLITE                 | ...EXPLORER 43 SATELLITE         |
| PSYCHOPHYSIOLOGY              | ...EXOS SATELLITES                   | ...EXPLORER 44 SATELLITE         |
| RADIO ASTRONOMY               | ...EXOS-A SATELLITE                  | ...EXPLORER 45 SATELLITE         |
| RADIO PHYSICS                 | ...EXOS-B SATELLITE                  | ...EXPLORER 46 SATELLITE         |
| REACTOR PHYSICS               | ...EXOS-C SATELLITE                  | ...EXPLORER 47 SATELLITE         |
| REENTRY PHYSICS               | ...EXOS-D SATELLITE                  | ...EXPLORER 48 SATELLITE         |
| RESPIRATORY PHYSIOLOGY        | ...EXOSAT SATELLITE                  | ...EXPLORER 49 SATELLITE         |
| SEISMOLOGY                    | ...EXPLORER SATELLITES               | ...EXPLORER 50 SATELLITE         |
| SOLAR DIAMETER                | ...APPLICATIONS EXPLORER SATELLITES  | ...EXPLORER 51 SATELLITE         |
| SOLAR PHYSICS                 | ...COSMIC BACKGROUND EXPLORER        | ...EXPLORER 52 SATELLITE         |
| SOLID MECHANICS               | SATELLITE                            | ...EXPLORER 53 SATELLITE         |
| % SOLID STATE PHYSICS         | ...DUAL AIR DENSITY EXPLORER         | ...EXPLORER 54 SATELLITE         |
| STELLAR PHYSICS               | ...DYNAMICS EXPLORER SATELLITES      | ...EXPLORER 55 SATELLITE         |
| SUNRISE                       | ...DYNAMICS EXPLORER 1 SATELLITE     | ...EXTREME ULTRAVIOLET EXPLORER  |
| SUNSET                        | ...DYNAMICS EXPLORER 2 SATELLITE     | SATELLITE                        |
| TAXONOMY                      | ...EXPLORER 1 SATELLITE              | ...FAR UV SPECTROSCOPIC EXPLORER |
| THEORETICAL PHYSICS           | ...EXPLORER 2 SATELLITE              | ...IMP                           |
| TRIGONOMETRY                  | ...EXPLORER 3 SATELLITE              | ...INTERNATIONAL MAGNETOSPHERIC  |
| UNDERWATER PHYSIOLOGY         | ...EXPLORER 4 SATELLITE              | EXPLORER                         |
| % ZOOLOGY                     | ...EXPLORER 5 SATELLITE              | ...INTERNATIONAL SUN EARTH       |
|                               | ...EXPLORER 6 SATELLITE              | EXPLORERS                        |
|                               | ...EXPLORER 7 SATELLITE              | ...INTERNATIONAL SUN EARTH       |
|                               | ...EXPLORER 8 SATELLITE              | EXPLORER 1                       |
| SCIENTIFIC INSTRUMENT MODULES | ...EXPLORER 9 SATELLITE              | ...INTERNATIONAL SUN EARTH       |
| USE SIM                       | ...EXPLORER 10 SATELLITE             | EXPLORER 2                       |
|                               | ...EXPLORER 11 SATELLITE             | ...INTERNATIONAL SUN EARTH       |
|                               | ...EXPLORER 12 SATELLITE             | EXPLORER 3                       |
| SCIENTIFIC SATELLITES         | ...EXPLORER 14 SATELLITE             | ...MICROMETEOROID EXPLORER       |
| 3107                          | ...EXPLORER 15 SATELLITE             | SATELLITES                       |
| GS                            | ...EXPLORER 16 SATELLITE             | ...RADIO ASTRONOMY EXPLORER      |
| ARTIFICIAL SATELLITES         | ...EXPLORER 17 SATELLITE             | SATELLITE                        |
| #SCIENTIFIC SATELLITES        | ...EXPLORER 18 SATELLITE             | ...SOLAR MESOSPHERE EXPLORER     |
| ...AMPE (SATELLITES)          | ...EXPLORER 19 SATELLITE             | ...UHURU SATELLITE               |
| ...ASTRONOMICAL SATELLITES    | ...EXPLORER 20 SATELLITE             | ...X RAY TIMING EXPLORER         |
| ...GAMMA RAY OBSERVATORY      | ...EXPLORER 21 SATELLITE             | ...GEOPOTENTIAL RESEARCH MISSION |
| ...GINGA SATELLITE            | ...EXPLORER 22 SATELLITE             | ...HAWKEYE SATELLITES            |
| ...HUBBLE SPACE TELESCOPE     |                                      |                                  |
| ...LARGE DEPLOYABLE REFLECTOR |                                      |                                  |
| ...SPACE INFRARED TELESCOPE   |                                      |                                  |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>..LONG DURATION EXPOSURE FACILITY</p> <p>..LZEEBE SATELLITE</p> <p>..MAGSAT SATELLITES</p> <p>...MAGSAT A SATELLITE</p> <p>...MAGSAT B SATELLITE</p> <p>...MAGSAT 1 SATELLITE</p> <p>..ORBIT</p> <p>...ORBIT CAL SATELLITE</p> <p>..OV-1 SATELLITES</p> <p>..OV-2 SATELLITES</p> <p>..OV-3 SATELLITES</p> <p>..OV-4 SATELLITES</p> <p>..OV-5 SATELLITES</p> <p>..SCATHA SATELLITE</p> <p>..SMALL SCIENTIFIC SATELLITES</p> <p>..UK SATELLITES</p> <p>...UK 4 SATELLITE</p> <p>..UPPER ATMOSPHERE RESEARCH SATELLITE (UARS)</p> <p>..CANADIAN SPACE PROGRAM CLUSTER MISSION</p> <p>ESRO 4 SATELLITE</p> <p>SOHO MISSION</p> <p>TECHNOLOGY FEASIBILITY SPACECRAFT</p> | <p>#SCIMITAR AIRCRAFT</p> <p>RT % AIRCRAFT</p> <p>SCINTILLATING FIBERS</p> <p>0702 2310</p> <p>UF SCINTILLATION FIBERS</p> <p>GS FIBERS</p> <p>.OPTICAL FIBERS</p> <p>.#SCINTILLATING FIBERS</p> <p>CALORIMETERS</p> <p>COSMIC RAYS</p> <p>FIBER OPTICS</p> <p>GAMMA RAY SPECTROMETERS</p> <p>GAMMA RAY TELESCOPES</p> <p>GAMMA RAYS</p> <p>HODOSCOPES</p> <p>PHOTOMULTIPLIER TUBES</p> <p>RADIATION COUNTERS</p> <p>SCINTILLATION</p> <p>SCINTILLATION COUNTERS</p>               | <p>SCISSION</p> <p>USE CLEAVAGE</p> <p>SCOOOPS</p> <p>0101 0102 0202 1502 1504 2806</p> <p>RT AIR INTAKES</p> <p>CONVEYORS</p> <p>DUCTS</p> <p>INTAKE SYSTEMS</p> <p>NOSE INLETS</p> <p>SIDE INLETS</p> <p>% WATER INTAKES</p> <p>SCOPOLAMINE</p> <p>USE HYOSCINE</p> <p>SCORE OMNIRANGE</p> <p>USE SELF CALIBRATING OMNIRANGE</p> <p>SCORE SATELLITE</p> <p>0706 3107</p> <p>GS ARTIFICIAL SATELLITES</p> <p>#SCORE SATELLITE</p>                                                                                                                                      |
| <p>SCIENTIFIC VISUALIZATION</p> <p>9001</p> <p>UF DATA VISUALIZATION</p> <p>RT COMPUTER GRAPHICS</p> <p>COMPUTERIZED SIMULATION</p> <p>DISPLAY DEVICES</p> <p>IMAGE PROCESSING</p> <p>NUMERICAL FLOW VISUALIZATION</p> <p>SOFTWARE TOOLS</p>                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>SCINTILLATION COUNTERS</p> <p>0905 1409 2402 2903 3009</p> <p>UF SCINTILLATORS</p> <p>SCINTILLOMETERS</p> <p>MEASURING INSTRUMENTS</p> <p>.COUNTERS</p> <p>..RADIATION COUNTERS</p> <p>..#SCINTILLATION COUNTERS</p> <p>.RADIATION MEASURING INSTRUMENTS</p> <p>..RADIATION COUNTERS</p> <p>..#SCINTILLATION COUNTERS</p> <p>CERENKOV COUNTERS</p> <p>NEUTRON COUNTERS</p> <p>PARTICLE TELESCOPES</p> <p>PHOTOMULTIPLIER TUBES</p> <p>PHOTOPEAK</p> <p>SCINTILLATING FIBERS</p> | <p>SCORING</p> <p>1905 3407</p> <p>UF SCRIBING</p> <p>RT ABRASION</p> <p>DEFECTS</p> <p>FRICTION</p> <p>PITTING</p> <p>WEAR</p> <p>SCORPIO CONSTELLATION</p> <p>USE SCORPIUS CONSTELLATION</p> <p>SCORPIUS CONSTELLATION</p> <p>3001</p> <p>UF SCORPIO CONSTELLATION</p> <p>GS CONSTELLATIONS</p> <p>#SCORPIUS CONSTELLATION</p> <p>RT ZODIAC</p> <p>SCOTCHLITE (TRADEMARK)</p> <p>1805 2310 3404</p> <p>RT MEMBRANE STRUCTURES</p> <p>REFRACTORY MATERIALS</p> <p>SCOTLAND</p> <p>1305</p> <p>GS NATIONS</p> <p>.UNITED KINGDOM</p> <p>.#SCOTLAND</p> <p>RT EUROPE</p> |
| <p>SCIENTISTS</p> <p>3404</p> <p>GS MANPOWER</p> <p>#SCIENTISTS</p> <p>PERSONNEL</p> <p>#SCIENTISTS</p> <p>AWARDS</p> <p>ENGINEERS</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>SCINTILLATION COUNTERS</p> <p>USE SCINTILLATING FIBERS</p> <p>SCINTILLATORS</p> <p>USE SCINTILLATION COUNTERS</p> <p>SCINTILLOMETERS</p> <p>USE SCINTILLATION COUNTERS</p>                                                                                                                                                                                                                                                                                                      | <p>SCORPIO CONSTELLATION</p> <p>USE SCORPIUS CONSTELLATION</p> <p>SCORPIUS CONSTELLATION</p> <p>3001</p> <p>UF SCORPIO CONSTELLATION</p> <p>GS CONSTELLATIONS</p> <p>#SCORPIUS CONSTELLATION</p> <p>RT ZODIAC</p> <p>SCOTCHLITE (TRADEMARK)</p> <p>1805 2310 3404</p> <p>RT MEMBRANE STRUCTURES</p> <p>REFRACTORY MATERIALS</p> <p>SCOTLAND</p> <p>1305</p> <p>GS NATIONS</p> <p>.UNITED KINGDOM</p> <p>.#SCOTLAND</p> <p>RT EUROPE</p>                                                                                                                                 |
| <p>SCIMITAR AIRCRAFT</p> <p>0207</p> <p>UF VICKERS SCIMITAR AIRCRAFT</p> <p>GS ATTACK AIRCRAFT</p> <p>.FIGHTER AIRCRAFT</p> <p>.#SCIMITAR AIRCRAFT</p> <p>BAC AIRCRAFT</p> <p>#SCIMITAR AIRCRAFT</p> <p>JET AIRCRAFT</p> <p>#SCIMITAR AIRCRAFT</p> <p>MONOPLANES</p>                                                                                                                                                                                                                                                                                                                                                                                                   | <p>SCINTILLATION COUNTERS</p> <p>USE SCINTILLATING FIBERS</p> <p>SCINTILLATORS</p> <p>USE SCINTILLATION COUNTERS</p> <p>SCINTILLOMETERS</p> <p>USE SCINTILLATION COUNTERS</p>                                                                                                                                                                                                                                                                                                      | <p>SCORPIO CONSTELLATION</p> <p>USE SCORPIUS CONSTELLATION</p> <p>SCORPIUS CONSTELLATION</p> <p>3001</p> <p>UF SCORPIO CONSTELLATION</p> <p>GS CONSTELLATIONS</p> <p>#SCORPIUS CONSTELLATION</p> <p>RT ZODIAC</p> <p>SCOTCHLITE (TRADEMARK)</p> <p>1805 2310 3404</p> <p>RT MEMBRANE STRUCTURES</p> <p>REFRACTORY MATERIALS</p> <p>SCOTLAND</p> <p>1305</p> <p>GS NATIONS</p> <p>.UNITED KINGDOM</p> <p>.#SCOTLAND</p> <p>RT EUROPE</p>                                                                                                                                 |

```

SCOUT HELICOPTER
USE P-531 HELICOPTER

SCOUT LAUNCH VEHICLE
3103
GS
LAUNCH VEHICLES
#SCOUT LAUNCH VEHICLE
ROCKET VEHICLES
.MULTISTAGE ROCKET VEHICLES
.#SCOUT LAUNCH VEHICLE

RT
ALGOL ENGINE
EXPLORER 9 SATELLITE
EXPLORER 16 SATELLITE
EXPLORER 19 SATELLITE
EXPLORER 20 SATELLITE
EXPLORER 22 SATELLITE
EXPLORER 23 SATELLITE
EXPLORER 24 SATELLITE
EXPLORER 25 SATELLITE
EXPLORER 27 SATELLITE
EXPLORER 30 SATELLITE
EXPLORER 37 SATELLITE
EXPLORER 39 SATELLITE
EXPLORER 40 SATELLITE
SAN MARCO SATELLITES
SOLID PROPELLANT ROCKET ENGINES
TX-354 ENGINE
X-248 ENGINE
X-254 ENGINE
X-258 ENGINES
X-259 ENGINE
XM-33 ENGINE

SCOUT PROJECT
3103 3409
GS
PROGRAMS
.NASA PROGRAMS
..NASA SPACE PROGRAMS
..#SCOUT PROJECT
..PROJECTS
.#SCOUT PROJECT
.SPACEL PROGRAMS
..NASA SPACE PROGRAMS
..#SCOUT PROJECT
RT % BOOSTERS
EXPLORER SATELLITES
LAUNCH VEHICLES

SCPC TRANSMISSION
USE SINGLE CHANNEL PER CARRIER
TRANSMISSION

SCR (RECTIFIERS)
USE SILICON CONTROLLED RECTIFIERS

```

```

% SCRAM
  2202 2204
  SN      (USE OF A MORE SPECIFIC TERM IS
  RECOMMENDED--CONSULT THE TERMS
  LISTED BELOW)
  RT      MISSILES
  SHUTDOWNS
  SUPERSONIC COMBUSTION RAMJET
  ENGINES

  SCRAMBLING (COMMUNICATION)
    0702 0703 3401
    RT      INTELLIGIBILITY
    SECURITY
    SIGNAL DISTORTION
    SIGNAL ENCODING
    VOCODERS
    VOICE COMMUNICATION

  SCRAMJET ENGINES
    USE SUPERSONIC COMBUSTION RAMJET
    ENGINES

  SCRAMJETS
    USE SUPERSONIC COMBUSTION RAMJET
    ENGINES

  SCRAP
    0505 0602 1502 1505 3404
    RT      CHIPS
    DEBRIS
    METAL PARTICLES
    WASTES

  SCRAPERS
    1504
    RT      CUTTERS
    FILES (TOOLS)
    HONING
    % SEPARATION

  SCREEN EFFECT
    2306 2310
    RT      % COMA
    DIELECTRICS
    EARTH MAGNETOSPHERE
    % EFFECTS
    ELECTROMAGNETIC WAVE FILTERS
    ELECTROMAGNETIC WAVE TRANSMISSION
    ELECTRON GAS
    SEMICONDUCTORS (MATERIALS)
    WAVE PROPAGATION

  % SCREENING
    1502 1504

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|                    |                                                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SN                 | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                |
| RT                 | FILTRATION<br>FINES<br>LOUVERS<br>SELECTION<br>WATER TREATMENT                                                                                                                    |
| % SCREENS          |                                                                                                                                                                                   |
| O705               | 0905 1407 2306 2310                                                                                                                                                               |
| SN                 | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                |
| RT                 | CURTAINS<br>DISPLAY DEVICES<br>PROTECTORS<br>SHIELDING<br>SIZING SCREENS<br>WIRE CLOTH                                                                                            |
| SCREW DISLOCATIONS |                                                                                                                                                                                   |
| 3203               |                                                                                                                                                                                   |
| GS                 | DEFECTS<br>.CRYSTAL DEFECTS<br>..CRYSTAL DISLOCATIONS<br>..#SCREW DISLOCATIONS<br>DISLOCATIONS (MATERIALS)<br>.CRYSTAL DISLOCATIONS<br>..#SCREW DISLOCATIONS<br>EDGE DISLOCATIONS |
| RT                 |                                                                                                                                                                                   |
| SCREW PINCH        |                                                                                                                                                                                   |
| 2501               |                                                                                                                                                                                   |
| GS                 | PINCH EFFECT<br>.PLASMA PINCH<br>.#SCREW PINCH<br>MAGNETIC FIELDS<br>MAGNETOHYDRODYNAMIC FLOW<br>PLASMA CONTROL<br>REVERSE FIELD PINCH<br>THETA PINCH<br>ZETA PINCH               |
| RT                 |                                                                                                                                                                                   |
| SCREWS             |                                                                                                                                                                                   |
| 1504               |                                                                                                                                                                                   |
| SN                 | (EXCLUDES PROPELLERS AND CRYSTAL<br>DEFECTS)                                                                                                                                      |
| GS                 | FASTENERS<br>#SCREWS                                                                                                                                                              |
| RT                 | ANCHORS (FASTENERS)<br>BOLTS<br>COUPLINGS<br>HOLDERS<br>NUTS (FASTENERS)                                                                                                          |

# NASA THESAURUS HIERARCHICAL UPDATE

STUDS (STRUCTURAL MEMBERS)  
THREADS

SCRIBING  
USE SCORING

SCRUBBERS  
1502 1504  
RT CLEANING  
COLUMNS (PROCESS ENGINEERING)  
FLUE GASES  
WASHING

SCRUBBING  
USE WASHING

SCRUBS (BOTANY)  
USE BRUSH (BOTANY)

SCUTUM CONSTELLATION  
3001  
GS CONSTELLATIONS  
#SCUTUM CONSTELLATION  
RT ZODIAC

SCVLLA  
2205  
GS PLASMA GENERATORS  
#SCVLLA  
RT MAGNETIC FIELDS  
MAGNETIC MIRRORS  
MAGNETIC VARIATIONS  
PLASMAS (PHYSICS)  
THERMONUCLEAR REACTIONS

SDP (COMPUTERS)  
USE SITE DATA PROCESSORS

SDS 900 SERIES COMPUTERS  
0801  
GS DATA PROCESSING EQUIPMENT  
.COMPUTERS  
..DIGITAL COMPUTERS  
...SDS 900 SERIES COMPUTERS  
....SDS 930 COMPUTER

SDS 930 COMPUTER  
0801  
GS DATA PROCESSING EQUIPMENT  
.COMPUTERS  
..DIGITAL COMPUTERS  
...SDS 900 SERIES COMPUTERS  
....SDS 930 COMPUTER

SDS 9300 COMPUTER

0801  
GS

DATA PROCESSING EQUIPMENT  
.COMPUTERS  
..DIGITAL COMPUTERS  
...SDS 9300 COMPUTER

SDV  
USE SHUTTLE DERIVED VEHICLES

SE-A  
USE EXPLORER 30 SATELLITE

SE-210 AIRCRAFT  
0204  
UF CARAVELLE AIRCRAFT  
SUD AVIATION SE-210 AIRCRAFT  
GS COMMERCIAL AIRCRAFT  
#SE-210 AIRCRAFT  
JET AIRCRAFT  
.TURBOFAN AIRCRAFT  
.#SE-210 AIRCRAFT  
MONOPLANES  
#SE-210 AIRCRAFT  
PASSENGER AIRCRAFT  
#SE-210 AIRCRAFT  
SUD AVIATION AIRCRAFT  
#SE-210 AIRCRAFT  
RT % AIRCRAFT

SE-3160 HELICOPTER  
0206  
UF ALOUETTE 3 HELICOPTER  
SUD AVIATION SE-3160 HELICOPTER  
GS .ALOUETTE HELICOPTERS  
.#SE-3160 HELICOPTER  
V/STOL AIRCRAFT  
.ROTARY WING AIRCRAFT  
..HELICOPTERS  
...ALOUETTE HELICOPTERS  
...#SE-3160 HELICOPTER

SEA BREEZE  
2003  
GS WIND (METEOROLOGY)  
#SEA BREEZE  
RT AEROLOGY  
AIR CURRENTS  
ATMOSPHERIC CIRCULATION  
BAROTROPIC FLOW  
CLIMATOLOGY  
GEOSTROPHIC WIND  
GUSTS  
MARINE ENVIRONMENTS  
METEOROLOGY

MONSOONS  
OFFSHORE ENERGY SOURCES  
TIDAL WAVES  
WIND DIRECTION  
WIND EFFECTS  
WIND EROSION  
WIND MEASUREMENT  
WINDPOWER UTILIZATION  
WINDS ALOFT

SEA FLOOR SPREADING  
1306 1310  
UF OCEAN FLOOR SPREADING  
RT EARTH CRUST  
EARTH MANTLE  
EARTH MOVEMENTS  
MID-OCEAN RIDGES  
OCEAN BOTTOM  
PLATES (TECTONICS)  
TECTONICS  
TERRADYNAMICS

SEA GRASSES  
0404 1310  
GS PLANTS (BOTANY)  
..GRASSES  
.#SEA GRASSES  
RT MARINE BIOLOGY  
OCEANOGRAPHY  
SEAWEEDS  
VEGETATION  
WETLANDS

SEA ICE  
0603 1310 1803 2003  
UF ICE PACKS  
GS ICE  
#SEA ICE  
..ICE FLOES  
..ICEBERGS  
..PRESSURE ICE  
RT AIR SEA ICE INTERACTIONS  
BAY ICE  
FREEZING  
GLACIAL DRIFT  
GLACIERS  
ICE ENVIRONMENTS  
ICE FORMATION  
ICE MAPPING  
LAKE ICE  
LAND ICE  
NUNATAKS  
OCEANOGRAPHY

SEA KEEPING

1403  
 RT ATTITUDE GYROS  
 DAMPING  
 GYROSCOPIC STABILITY  
 GYROSTABILIZERS  
 MOTION STABILITY  
 % STABILIZERS  
 TORQUERS  
  
 SEA KING HELICOPTER  
 USE SH-3 HELICOPTER  
  
 SEA KNIGHT HELICOPTER  
 USE CH-46 HELICOPTER  
  
 SEA LAUNCHING  
 1104 3102  
 GS LAUNCHING  
 #SEA LAUNCHING  
 RT ANTISHIP MISSILES  
 ANTISHIP WARFARE  
 BALLISTIC MISSILE SUBMARINES  
 CATAPULTS  
 DRYDOCKS  
 FLEET BALLISTIC MISSILES  
 MISSILE LAUNCHERS  
 POSEIDON MISSILES  
 ROCKET LAUNCHERS  
 TORPEDOES  
 WATER TAKEOFF AND LANDING AIRCRAFT  
  
 SEA LAW  
 3403  
 GS LAW (JURISPRUDENCE)  
 . INTERNATIONAL LAW  
 #SEA LAW  
 RT % COOPERATION  
 INTERNATIONAL COOPERATION  
 RULES  
 UNITED NATIONS  
  
 SEA LEVEL  
 1305  
 GS ALTITUDE  
 #SEA LEVEL  
 RT OCEAN SURFACE  
 OCEANOGRAPHY  
 SEA STATES  
  
 SEA OF JAPAN  
 1305  
 GS SEAS  
 #SEA OF JAPAN  
 RT ASIA  
  
 SEA OF OKHOTSK  
 1305 1310  
 GS SEAS  
 #SEA OF OKHOTSK  
 RT PACIFIC OCEAN  
 U.S.S.R.  
  
 SEA ROUGHNESS  
 1310  
 GS ROUGHNESS  
 #SEA ROUGHNESS  
 RT HYDRODYNAMIC COEFFICIENTS  
 OCEAN MODELS  
 OCEAN SURFACE  
 OCEANOGRAPHY  
 SURFACE WAVES  
 TIDAL WAVES  
 TIDE POWERED GENERATORS  
 TIDE POWERED MACHINES  
 TIDEPOWER  
 TIDES  
 TURBULENCE  
 WATER CURRENTS  
 WATER WAVES  
 WATERWAVE ENERGY CONVERSION  
 WATERWAVE POWERED MACHINES  
 WIND EFFECTS  
 WIND VELOCITY  
  
 SEA STATES  
 1310  
 RT OCEAN MODELS  
 OCEAN SURFACE  
 OCEAN TEMPERATURE  
 OCEANOGRAPHIC PARAMETERS  
 OCEANOGRAPHY  
 SEA LEVEL  
 TOPEX  
 WATER CURRENTS  
 WATER WAVES  
 WIND EFFECTS  
  
 SEA SURFACE TEMPERATURE  
 GS OCEANOGRAPHIC PARAMETERS  
 . OCEAN TEMPERATURE  
 #SEA SURFACE TEMPERATURE  
 TEMPERATURE  
 . WATER TEMPERATURE  
 .. OCEAN TEMPERATURE  
 .. #SEA SURFACE TEMPERATURE  
 AIR WATER INTERACTIONS  
 LAND SURFACE TEMPERATURE  
 OCEAN SURFACE  
 OCEANOGRAPHY  
 SURFACE TEMPERATURE  
  
 RT  
  
 SEA TRUTH  
 1305  
 RT AERIAL PHOTOGRAPHY  
 COASTAL CURRENTS  
 IMAGERY  
 OCEAN SURFACE  
 OCEAN TEMPERATURE  
 PHOTOINTERPRETATION  
  
 SEA URCHINS  
 0402  
 GS ANIMALS  
 . INVERTEBRATES  
 . #SEA URCHINS  
  
 SEA WALLS  
 USE BREAKWATERS  
  
 SEA WATER  
 0404 0603 1310  
 GS WATER  
 #SEA WATER  
 RT BRINES  
 COASTAL WATER  
 FISHERIES  
 MARINE RESOURCES  
 NEARSHORE WATER  
 OCEAN SURFACE  
 OCEAN TEMPERATURE  
 OCEANOGRAPHY  
 RED TIDE  
 SALINITY  
 SEAWEEDS  
 THERMOCLINES  
 UNDERWATER PHOTOGRAPHY  
 UNDERWATER RESOURCES  
 WATER RESOURCES  
  
 SEAFARER PROJECT  
 0702  
 UF GLOBAL COMMUNICATIONS ANTENNA GRID  
 (NAVY)  
 UNDERGROUND RADIO ANTENNA GRID  
 (NAVY)  
 GS PROGRAMS  
 . PROJECTS  
 . #SEAFARER PROJECT  
 EXTREMELY LOW FREQUENCIES  
 RADIO TRANSMISSION  
 SUBMARINES  
 TELECOMMUNICATION  
 UNDERWATER COMMUNICATION  
  
 RT  
  
 SEAHORSE HELICOPTER



# NASA THESAURUS HIERARCHICAL UPDATE

## USE UH-34 HELICOPTER

SEALANTS  
USE SEALERS

### SEALERS

0603 1501 1802  
UF SEALANTS  
RT ADHESIVES  
COATINGS  
DOPES  
FILLERS  
PACKAGING  
PACKINGS (SEALS)  
PAINTS  
SEALING  
SEALS (STOPPERS)  
SEAMS (JOINTS)  
SOLDERS  
VARNISHES

### SEALING

0303 0507 0603 1501 1504  
GS #SEALING  
RT .SELF SEALING  
ADHESION  
ADHESIVE BONDING  
BINDING  
BLOCKING  
BLOWERS  
BONDING  
BRAZING  
CAULKING  
CEMENTS  
CLAMPS  
CLOSING  
COATING  
COATINGS  
CONTAINMENT  
COVERINGS  
ENCAPSULATING  
GLANDS (SEALS)  
% JOINING  
LINING PROCESSES  
MOISTURE RESISTANCE  
% PACKING  
PACKINGS (SEALS)  
PLUGGING  
RETAINING  
RIVETING  
SEALERS  
SOLDERING  
SPRAYING  
STOPPING  
WATERPROOFING

## WELDING

SEALS (ANIMALS)  
0402

GS ANIMALS  
.VERTEBRATES  
..MAMMALS  
...MARINE MAMMALS  
...#SEALS (ANIMALS)  
RT MARINE BIOLOGY

SEALS (STOPPERS)  
1501

GS #SEALS (STOPPERS)  
.BRUSH SEALS  
.GASKETS  
.GLANDS (SEALS)  
.HERMETIC SEALS  
.LABYRINTH SEALS  
.O RING SEALS  
.PACKINGS (SEALS)  
.PLUGS  
.PUMP SEALS  
RT AIR LOCKS  
BARRIER LAYERS  
% BARRIERS  
% BLOCKING  
% CAPS  
CLOSURES  
CONSTRUCTIONS  
CUFFS  
PLUGGING  
SEALERS  
SPHERICAL CAPS  
% TAPES  
VALVES

RT

% BARRIERS  
% BLOCKING  
% CAPS  
CLOSURES  
CONSTRUCTIONS  
CUFFS  
PLUGGING  
SEALERS  
SPHERICAL CAPS  
% TAPES  
VALVES

SEAMOUNTS  
1306

RT CONTINENTAL SHELVES  
CREVASSES  
% FAULTS  
FOLDS (GEOLOGY)  
ISLANDS  
LANDFORMS  
MID-OCEAN RIDGES  
OCEAN BOTTOM  
STRUCTURAL BASINS

SEAMS (JOINTS)  
1507 3203

GS JOINTS (JUNCTIONS)  
#SEAMS (JOINTS)  
RT ADHESIVES  
FILLET

METAL JOINTS  
SEALERS

SEAPLANES

0201 0203 1204  
GS WATER TAKEOFF AND LANDING AIRCRAFT  
#SEAPLANES  
RT AMPHIBIOUS AIRCRAFT  
AMPHIBIOUS VEHICLES  
HULLS (STRUCTURES)  
MONOPLANES

SEARCH AND RESCUE SATELLITE  
USE SARSAT

SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE  
USE PROJECT SETI

SEARCH PROFILES  
0802 3405

GS SEARCHING  
#SEARCH PROFILES  
RT DATA RETRIEVAL  
INFORMATION RETRIEVAL  
% PROFILES

SEARCH RADAR  
0705 0709 3401

GS RADAR  
#SEARCH RADAR  
..NORTH AMERICAN SEARCH AND  
RANGING RADAR  
..OVER-THE-HORIZON RADAR

RT AIRPORT SURFACE DETECTION EQUIPMENT

COHERENT RADAR  
CONTINUOUS WAVE RADAR  
PULSE RADAR  
RADAR DETECTION  
RADAR TRACKING  
SATELLITE-BORNE RADAR  
SIDE-LOOKING RADAR  
SURVEILLANCE RADAR  
TRACKING RADAR  
TRADEX RADAR SYSTEM

SEARCHING

0705 0709 0802 0803 3405  
GS #SEARCHING

RT .SEARCH PROFILES  
CONICAL SCANNING  
COSPAS

PANORAMIC SCANNING  
RECONNAISSANCE  
RETRIEVAL  
SARSAT

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SCANNING
SELECTION

SEARCHLIGHTS
  0203 0904 1101
  GS LIGHTING EQUIPMENT
  . LUMINAIRES
  . #SEARCHLIGHTS
  RT AIRPORT LIGHTS
  ARC LAMPS
  BEACONS
  PROJECTORS
  RUNWAY LIGHTS

SEAS
  1305
  GS #SEAS
  . ARABIAN SEA
  . BALTIC SEA
  . BARENTS SEA
  . BEAUFORT SEA (NORTH AMERICA)
  . BERING SEA
  . BLACK SEA
  . CARIBBEAN SEA
  . CASPIAN SEA
  . CHUKCHI SEA
  . MEDITERRANEAN SEA
  . ADRIATIC SEA
  . NORTH SEA
  . RED SEA
  . SALTON SEA (CA)
  . SEA OF JAPAN
  . SEA OF OKHOTSK
  ARCHIPELAGOES
  COASTAL CURRENTS
  COASTS
  DEEP WATER
  EARTH HYDROSPHERE
  OCEAN TEMPERATURE
  OCEANOGRAPHY
  OCEANS
  SARGASSO SEA
  SEAWEEDES
  SHALLOW WATER
  SHOALS
  STRAITS
  THERMAL POLLUTION
  UNDERWATER PHOTOGRAPHY

SEASAT PROGRAM
  1305 1306 1309 3409
  GS PROGRAMS
  . NASA PROGRAMS
  . . NASA SPACE PROGRAMS
  . . . EARTH RESOURCES PROGRAM

    . . . EARTH RESOURCES SURVEY PROGRAM
    . . . #SEASAT PROGRAM
    . . . LANDSAT SATELLITES
    . . . OCEANOGRAPHY
    RT LANDSAT SATELLITES
    SEASAT SATELLITES
    1305 1306 1308 3107 3410
    GS ARTIFICIAL SATELLITES
    #SEASAT SATELLITES
    . . SEASAT 1
    . . SEASAT-B SATELLITE
    RT LANDSAT SATELLITES
    NASA PROGRAMS
    OCEANOGRAPHY
    PROGRAMS
    SATELLITE ALTIMETRY
    SYNCHRONOUS EARTH OBSERVATORY
    SATELLITE

SEASAT 1
  1305 1306 1308 3107 3410
  GS ARTIFICIAL SATELLITES
  . SEASAT SATELLITES
  . #SEASAT 1
  RT LANDSAT SATELLITES
  OCEANOGRAPHY
  PROGRAMS
  SEASAT-B SATELLITE

SEASAT-B SATELLITE
  1305 1306 1308 3107 3410
  GS ARTIFICIAL SATELLITES
  . SEASAT SATELLITES
  . #SEASAT-B SATELLITE
  RT LANDSAT SATELLITES
  OCEANOGRAPHY
  PROGRAMS
  SEASAT 1

SEASONAL VARIATIONS
  USE ANNUAL VARIATIONS

SEASONS
  2001 3001
  GS #SEASONS
  . AUTUMN
  . SPRING (SEASON)
  . SUMMER
  . WINTER
  RT ANNUAL VARIATIONS

SEABACEOUS GLANDS
  0404 0405
  GS ANATOMY
  . GLANDS (ANATOMY)
  . #SEABACEOUS GLANDS

SEBACIC ACID

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# NASA THESAURUS HIERARCHICAL UPDATE

0403 1808  
 GS ACIDS  
 . CARBOXYLIC ACIDS  
 . . FATTY ACIDS  
 . . SEBACIC ACID  
 ORGANIC COMPOUNDS  
 . CARBOXYLIC ACIDS  
 . . FATTY ACIDS  
 . . SEBACIC ACID  
 SECONDARY BATTERIES  
 USE STORAGE BATTERIES  
 SECONDARY COSMIC RAYS  
 2901  
 UF MOLIÈRE FORMULA  
 GS IONIZING RADIATION  
 . COSMIC RAYS  
 . #SECONDARY COSMIC RAYS  
 RT ATMOSPHERIC RADIATION  
 COSMIC RAY ALBEDO  
 COSMIC RAY SHOWERS  
 ELECTRON DECAY RATE  
 ELECTRON PHOTON CASCADES  
 ELECTRON PRECIPITATION  
 PRIMARY COSMIC RAYS  
 SINGLE EVENT UPSETS  
 SECONDARY EMISSION  
 2402 2403  
 GS EMISSION  
 . PARTICLE EMISSION  
 . . ELECTRON EMISSION  
 . . #SECONDARY EMISSION  
 RT DYNODES  
 ELECTRON IRRADIATION  
 FIELD EMISSION  
 MONOSCOPES  
 MULTIPACTOR DISCHARGES  
 PHOTOMULTIPLIER TUBES  
 SCANNING ELECTRON MICROSCOPY  
 TOWNSEND AVALANCHE  
 SECONDARY FLOW  
 1203 3501  
 GS FLUID FLOW  
 . VISCIOUS FLOW  
 . . BOUNDARY LAYER FLOW  
 . . #SECONDARY FLOW  
 TRANSLATIONAL MOTION  
 . THREE DIMENSIONAL MOTION  
 . . THREE DIMENSIONAL FLOW  
 . . #SECONDARY FLOW  
 RT COMPRESSIBILITY EFFECTS  
 CORNER FLOW

THREE DIMENSIONAL BOUNDARY LAYER  
 VORTICES  
 VORTICITY  
 SECONDARY INJECTION  
 1202 2805 2808  
 GS INJECTION  
 #SECONDARY INJECTION  
 RT FLUID INJECTION  
 SHOCK WAVE CONTROL  
 SHOCK WAVE PROPAGATION  
 SUPERSONIC FLOW  
 THRUST AUGMENTATION  
 THRUST VECTOR CONTROL  
 SECONDARY ION MASS SPECTROMETRY  
 0601 1411 2306 2310  
 UF SIMS (SPECTROMETRY)  
 GS SPECTROSCOPY  
 #SECONDARY ION MASS SPECTROMETRY  
 RT MASS SPECTROMETERS  
 SECONDARY RADAR  
 0702 0705  
 GS RADAR  
 #SECONDARY RADAR  
 RT DISCRETE ADDRESS BEACON SYSTEM  
 INTERROGATION  
 SECONDARY WAVES  
 USE S WAVES  
 SECRETIONS  
 0404 0405 0408  
 GS #SECRETIONS  
 . ENDOCRINE SECRETIONS  
 . . HORMONES  
 . . . CORTICOSTEROIDS  
 . . . . ALDOSTERONE  
 . . . . HYDROXYCORTICOSTEROID  
 . . . . CORTISONE  
 . . . ESTROGENS  
 . . . . HYPERTENSIN  
 . . . PITUITARY HORMONES  
 . . . . ADRENOCORTICOTROPIN (ACTH)  
 . . . PROSTAGLANDINS  
 . . . THYROXINE  
 . . . INSULIN  
 . . . SWEAT  
 RT BODY FLUIDS  
 GALL  
 GLANDS (ANATOMY)  
 HYDROGEN METABOLISM  
 METABOLISM  
 MINERAL METABOLISM

SKIN (ANATOMY)  
 % SECTIONS  
 0202 0404 0405 1102 1106 3110 3203  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT CATEGORIES  
 CLASSES  
 SUBDIVISIONS  
 SUBSIDIARIES  
 % SECTORS  
 1902 3406  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT AREA  
 CIRCLES (GEOMETRY)  
 REGIONS  
 SECULAR PERTURBATION  
 USE LONG TERM EFFECTS  
 SECULAR VARIATIONS  
 0401 0408 0507  
 GS VARIATIONS  
 . PERIODIC VARIATIONS  
 . #SECULAR VARIATIONS  
 RT ATMOSPHERIC PHYSICS  
 SOLAR ACTIVITY EFFECTS  
 SOLAR CYCLES  
 TELECONNECTIONS (METEOROLOGY)  
 SECURITY  
 3401 3405  
 GS #SECURITY  
 . AIRPORT SECURITY  
 . COMPUTER INFORMATION SECURITY  
 RT % CLASSIFYING  
 COMPUTER PROGRAM INTEGRITY  
 CRIME  
 INTEGRITY  
 POLICE  
 PRIVACY  
 SCRAMBLING (COMMUNICATION)  
 SELECTIVE DISSEMINATION OF  
 INFORMATION  
 VULNERABILITY  
 SEDATIVES  
 0403 0405 0408  
 GS DRUGS  
 #SEDATIVES  
 RT PENTOBARBITAL

PHENOBARBITAL  
 PSYCHOTROPIC DRUGS  
 TRANQUILIZERS

SEDIMENT TRANSPORT  
 1306 1310  
 RT  
 MASS FLOW  
 MASS TRANSFER  
 SEDIMENTS

SEDIMENTARY ROCKS  
 1305 1306  
 GS  
 ROCKS  
 #SEDIMENTARY ROCKS  
 ..CARBONACEOUS ROCKS  
 ...COAL  
 ....ANTHRACITE  
 ....LIGNITE  
 ...LIMESTONE  
 ..SANDSTONES  
 ..SHALES  
 ..ALLUVIUM  
 BRECCIA  
 CLAYS  
 DOLOMITE (MINERAL)  
 GYPSUM  
 IGNEOUS ROCKS  
 % LAYERS  
 MONAZITE SANDS  
 PETROGRAPHY  
 SANDS  
 SEDIMENTS  
 SHATTER CONES  
 SOILS  
 STRATIGRAPHY

SEDIMENTS  
 0603 1306 1310  
 UF  
 SILTS  
 GS #SEDIMENTS  
 .GRAVELS  
 .MUD  
 .SANDS  
 ..MONAZITE SANDS  
 ..TAR SANDS  
 ..ALLUVIUM  
 CLAYS  
 DEPOSITION  
 DEPOSITS  
 DREDGED MATERIALS  
 FANS (LANDFORMS)  
 GLACIAL DRIFT  
 GRIT  
 LITTORAL DRIFT  
 MARINE CHEMISTRY

OCEAN BOTTOM  
 PEAT  
 SEDIMENT TRANSPORT  
 SEDIMENTARY ROCKS  
 SEWAGE TREATMENT  
 SLUDGE

SEE (SOFTWARE ENGINEERING ENVIRONMENTS)  
 USE PROGRAMMING ENVIRONMENTS

SEEBECK COEFFICIENT  
 USE SEEBECK EFFECT

SEEBECK EFFECT  
 1001 1002 1704 2304 3304  
 UF SEEBECK COEFFICIENT  
 RT % EFFECTS  
 PELTIER EFFECTS  
 TEMPERATURE EFFECTS  
 THERMOCOUPLES  
 THERMODYNAMIC PROPERTIES  
 THERMOELECTRICITY  
 THERMOPHYSICAL PROPERTIES  
 TRANSPORT PROPERTIES

SEEDING (INOCULATION)  
 USE INOCULATION

SEEDS  
 0409  
 RT  
 ALFALFA  
 BARLEY  
 CITRUS TREES  
 CORN  
 EMBRYOS  
 FARM CROPS  
 GRAINS (FOOD)  
 NUTS (FRUITS)  
 OATS  
 PLANTING  
 PLANTS (BOTANY)  
 SUGAR BEETS  
 SUGAR CANE  
 TOMATOES  
 UTRICLE  
 VEGETABLES  
 VIABILITY

SEEING (ASTRONOMY)  
 1301 1412 3001  
 UF  
 ATMOSPHERIC SEEING  
 RT  
 ASTRONOMICAL OBSERVATORIES  
 ASTRONOMY  
 ATMOSPHERIC EFFECTS  
 ATMOSPHERIC OPTICS

ATMOSPHERIC TURBULENCE  
 OPTICAL CORRECTION PROCEDURE  
 SCINTILLATION  
 SPACE OBSERVATIONS (FROM EARTH)  
 TELESCOPES  
 TURBULENCE EFFECTS  
 VISUAL OBSERVATION

SEEKERS  
 USE HOMING DEVICES

SEEPAGE  
 0505  
 RT  
 CANALS  
 DRAINAGE  
 FLOOD DAMAGE  
 FLOW NETS  
 HYDRODYNAMICS  
 INTRUSION  
 IRRIGATION  
 LEAKAGE  
 LOSSES  
 OFFSHORE ENERGY SOURCES  
 PENETRATION  
 PERCOLATION  
 PERMEABILITY  
 PIEZOMETERS  
 WATER CONSUMPTION

SEGMENTS  
 1902 3406  
 RT  
 CIRCLES (GEOMETRY)  
 % COMPONENTS  
 CURVES (GEOMETRY)  
 LINES (GEOMETRY)  
 RADII

SEGREGATION  
 2401 2403 2405  
 RT % CHARACTERISTICS  
 CRACK PROPAGATION  
 METAL FATIGUE

SEGREGATION  
 USE SEPARATION

SEISMIC ENERGY  
 1306 1308  
 RT  
 EARTHQUAKE DAMAGE  
 % ENERGY  
 STRAIN ENERGY METHODS

SEISMIC WAVES  
 1306 1308  
 UF  
 ELECTROSEISMIC EFFECT

```

GS      ELASTIC WAVES
        #SEISMIC WAVES
        ..LOVE WAVES
        ..MICROSEISMS
        ..RAYLEIGH WAVES
        CRUSTAL FRACTURES
        DETONATION WAVES
        DILATATIONAL WAVES
        EARTH MOVEMENTS
        EARTHQUAKE DAMAGE
        EARTHQUAKE RESISTANCE
        EARTHQUAKE RESISTANT STRUCTURES
        EARTHQUAKES
        GUTENBERG ZONE
        LARGE APERTURE SEISMIC ARRAY
        LONGITUDINAL WAVES
        P WAVES
        PLANETARY QUAKES
        POLARIZED ELASTIC WAVES
        S WAVES
        SEISMOLOGY
        SH WAVES
        SHOCK WAVES
        SURFACE WAVES
        TSUNAMI WAVES
        UNDERGROUND EXPLOSIONS
        % WAVES

SEISMOCARDIOGRAPHY
O405 O501
GS      BIOENGINEERING
        .BIOMETRICS
        ..CARDIOGRAPHY
        ..#SEISMOCARDIOGRAPHY
        BALLISTOCARDIOGRAPHY
        FIBRILLATION

RT      SEISMOGRAMS
        1306 1308 1406
        RT      SEISMOGRAPHS

SEISMOGRAPHS
1306 1308 1406
UF      SEISMOMETERS
GS      MEASURING INSTRUMENTS
        .VIBRATION METERS
        .#SEISMOGRAPHS
        ...LUNAR SEISMOGRAPHS
        RECORDING INSTRUMENTS
        #SEISMOGRAPHS
        ..LUNAR SEISMOGRAPHS
        ACCELEROMETERS
        ACOUSTIC MEASUREMENT
        PHASED ARRAYS
        SEISMOGRAMS

RT

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SEISMOMETERS
USE  SEISMOGRAPHS

SEIZURES
O405  O408
RT    CONVULSIONS
      CRAMPS

SEL COMPUTERS
O801
GS    DATA PROCESSING EQUIPMENT
      .COMPUTERS
      ..DIGITAL COMPUTERS
      ..#SEL COMPUTERS

SELECTION
3406 3407
UF    CHOICE
GS    #SELECTION
      .PERSONNEL SELECTION
      ..PILOT SELECTION
      .SITE SELECTION
      RT  CERTIFICATION
          % CLASSIFYING
          COLLECTION
          DECISIONS
          EVALUATION
          FIGURE OF MERIT
          OPTIONS
          RANKING

```

SELECTIVE FADING  
O702 O710 2402  
GS FADING  
    .SIGNAL FADING  
    .#SELECTIVE FADING  
RT FREQUENCY ANALYZERS  
GROUND WAVE PROPAGATION  
MODULATION  
SIDEBANDS  
SIGNAL FADING RATE

SELECTIVE SURFACES  
O301  
UF SOLAR SELECTIVE COATINGS  
RT ENERGY ABSORPTION FILMS  
SELECTIVITY  
SOLAR COLLECTORS  
SOLAR ENERGY ABSORBERS

SELECTIVITY

3407  
RT DISCRIMINATION  
PHOTOTHERMAL CONVERSION  
SELECTIVE SURFACES

SELECTORS  
O902 0904  
RT ANALYZERS  
CIRCUITS  
ELECTRIC RELAYS  
SAMPLERS  
SWITCHES  
SWITCHING CIRCUITS

SELENIDES  
O603 1804  
GS CHALCOGENIDES  
#SELENIDES  
..CADMIUM SELENIDES  
..COPPER SELENIDES  
..GALLIUM SELENIDES  
..LEAD SELENIDES  
..ZINC SELENIDES  
SELENIUM COMPOUNDS  
#SELENIDES  
..CADMIUM SELENIDES  
..COPPER SELENIDES  
..GALLIUM SELENIDES  
..LEAD SELENIDES  
..ZINC SELENIDES

SELENIUM  
1703  
GS CHEMICAL ELEMENTS  
#SELENIUM  
RT SELENIUM ISOTOPES

SELENIUM ALLOYS  
1701 1703 0603  
GS ALLOYS  
#SELENIUM ALLOYS  
RT COPPER

SELENIUM COMPOUNDS  
O603 1804  
GS #SELENIUM COMPOUNDS  
..SELENIDES  
..CADMIUM SELENIDES  
..COPPER SELENIDES  
..GALLIUM SELENIDES  
..LEAD SELENIDES  
..ZINC SELENIDES  
SELENIUM OXIDES  
RT % CHEMICAL COMPOUNDS  
% GROUP 6A COMPOUNDS

SELENIUM ISOTOPES  
O603 1703  
GS CHEMICAL ELEMENTS  
..NUCLIDES  
..ISOTOPES  
..#SELENIUM ISOTOPES  
RT SELENIUM

SELENIUM OXIDES  
O603 1804  
GS CHALCOGENIDES  
..OXIDES  
..#SELENIUM OXIDES  
SELENIUM COMPOUNDS  
#SELENIUM OXIDES

SELENOGRAPHY  
3001 3004  
RT GEOGRAPHY  
LUNAR CRATERS  
LUNAR CRUST  
LUNAR LANDING SITES  
LUNAR MAPS  
LUNAR MOBILE LABORATORIES  
LUNAR RAYS  
LUNAR ROCKS  
LUNAR TOPOGRAPHY  
MOON  
SELENOLOGY  
SURFACE PROPERTIES

SELENOLOGY  
3001 3004  
RT ASTRONOMY  
LUNAR COMPOSITION  
LUNAR CORE  
LUNAR CRATERS  
LUNAR CRUST  
LUNAR DUST  
LUNAR ECHOES  
LUNAR ECLIPSES  
LUNAR EFFECTS  
LUNAR ENVIRONMENT  
LUNAR EQUATOR  
LUNAR EVOLUTION  
LUNAR EXPLORATION  
LUNAR FAR SIDE  
LUNAR FIGURE  
LUNAR GEOLOGY  
LUNAR GRAVITATION  
LUNAR GRAVITATIONAL EFFECTS  
LUNAR LIMB  
LUNAR LUMINESCENCE  
LUNAR MAGNETIC FIELDS

LUNAR MANTLE  
LUNAR MARIA  
LUNAR OCCULTATION  
LUNAR PHASES  
LUNAR RADAR ECHOES  
LUNAR RADIATION  
LUNAR ROCKS  
LUNAR ROTATION  
LUNAR SEISMOGRAPHS  
LUNAR SHADOW  
LUNAR SOIL  
LUNAR SURFACE  
LUNAR TEMPERATURE  
LUNAR TIDES  
LUNAR TOPOGRAPHY  
MOON  
MOONQUAKES  
REGOLITH  
SELENOGRAPHY

SELF ABSORPTION  
1411 2306 2402  
GS ENERGY ABSORPTION  
..RADIATION ABSORPTION  
..#SELF ABSORPTION  
RT % ABSORPTION  
ABSORPTION SPECTRA  
ABSORPTIVITY  
AUTOMATIC CONTROL  
DIFFUSION  
% RADIATION

SELF ADAPTIVE CONTROL SYSTEMS  
O802 1003 1905 2102  
GS AUTOMATIC CONTROL  
..ADAPTIVE CONTROL  
..#SELF ADAPTIVE CONTROL SYSTEMS  
RT ACTIVE CONTROL  
ADAPTIVE OPTICS  
AUTOMATA THEORY  
AUTONOMY  
% CONTROL  
% SYSTEMS

SELF ALIGNMENT  
O203 1003 2102  
GS ALIGNMENT  
#SELF ALIGNMENT  
AUTOMATIC CONTROL  
#SELF ALIGNMENT  
RT ACTIVE CONTROL  
ADAPTIVE CONTROL  
LANDING GEAR  
MODEL REFERENCE ADAPTIVE CONTROL  
SERVOMECHANISMS

# NASA THESAURUS HIERARCHICAL UPDATE

SELF CALIBRATING OMNIRANGE  
 O705 1410 2102 2103 2104  
 UF SCORE OMNIRANGE  
 GS NAVIGATION AIDS  
 .BEACONS  
 ..RADIO BEACONS  
 ...OMNIDIRECTIONAL RADIO RANGES  
 ....#SELF CALIBRATING OMNIRANGE  
 RADIO EQUIPMENT  
 .RADIO TRANSMITTERS  
 ..RADIO BEACONS  
 ...OMNIDIRECTIONAL RADIO RANGES  
 ....#SELF CALIBRATING OMNIRANGE  
 TRANSMITTERS  
 .RADIO TRANSMITTERS  
 ..RADIO BEACONS  
 ...OMNIDIRECTIONAL RADIO RANGES  
 ....#SELF CALIBRATING OMNIRANGE  
 RT SOLAR COMPASSES

SELF CONSISTENT FIELDS  
 2304 2307 2402 2502 2601  
 UF SCF  
 RT COMPUTATIONAL CHEMISTRY  
 FIELD THEORY (PHYSICS)  
 % FIELDS  
 HARTREE APPROXIMATION  
 MAGNETIC FIELDS  
 MOLECULAR ORBITALS  
 QUANTUM ELECTRODYNAMICS  
 SHELL THEORY

SELF DEPLOYING SPACE STATIONS  
 USE SELF ERECTING DEVICES  
 SPACE STATIONS

SELF DIFFUSION (SOLID STATE)  
 O603  
 GS DIFFUSION  
 #SELF DIFFUSION (SOLID STATE)  
 RT ATOMIC MOBILITIES  
 IONIC DIFFUSION  
 MOLECULAR DIFFUSION  
 PARTICLE DIFFUSION

SELF ERECTING DEVICES  
 O203 O303 0701 2104 3110  
 UF SELF DEPLOYING SPACE STATIONS  
 RT % AUTOMATION  
 % DEVICES  
 % EQUIPMENT  
 INFLATABLE SPACECRAFT  
 INFLATABLE STRUCTURES  
 ORBITAL ASSEMBLY

## SPACE ERECTABLE STRUCTURES

SELF EXCITATION  
 1002 1003 1504 1601 2501  
 GS EXCITATION  
 #SELF EXCITATION  
 RT FORCED VIBRATION  
 FREE VIBRATION  
 OSCILLATORS  
 RESONATORS

SELF FOCUSING  
 1003 1412 2310  
 GS FOCUSING  
 #SELF FOCUSING  
 RT IMAGE CONTRAST  
 % MACHINERY

OPTICAL CORRECTION PROCEDURE  
 OPTICAL MEASURING INSTRUMENTS

SELF INDUCED VIBRATION  
 1003 1504 2308  
 GS VIBRATION  
 .STRUCTURAL VIBRATION  
 #SELF INDUCED VIBRATION  
 ...PANEL FLUTTER  
 ...SUBSONIC FLUTTER  
 ...SUPERSONIC FLUTTER  
 ...TRANSONIC FLUTTER  
 BENDING VIBRATION  
 FLUTTER  
 FORCED VIBRATION  
 FREE VIBRATION  
 MISSILE VIBRATION  
 PILOT INDUCED OSCILLATION  
 RANDOM VIBRATION  
 TORSIONAL VIBRATION

SELF INITIATED ANTIAIRCRAFT MISSILES  
 USE SIAM MISSILES

SELF LUBRICATING MATERIALS  
 1502 1503 1504  
 RT IMPREGNATING  
 LUBRICATION  
 % MATERIALS  
 SOLID LUBRICANTS  
 SPACECRAFT LUBRICATION

SELF LUBRICATION  
 1503 1504  
 GS LUBRICATION  
 #SELF LUBRICATION  
 RT IMPREGNATING

SELF MANEUVERING UNITS  
 1003 3004 3110  
 UF PERSONNEL PROPULSION SYSTEMS  
 REACTION JET BACKPACKS  
 SMU (MANEUVERING UNITS)  
 SPACE SELF MANEUVERING UNITS  
 GS #SELF MANEUVERING UNITS  
 .IMLSS  
 RT ASTRONAUT MANEUVERING EQUIPMENT  
 EXTRAVEHICULAR ACTIVITY  
 EXTRAVEHICULAR MOBILITY UNITS  
 MANEUVERS  
 MANNED MANEUVERING UNITS

SELF ORGANIZING SYSTEMS  
 O802  
 UF PERCEPTORS  
 RT ARTIFICIAL INTELLIGENCE  
 MACHINE LEARNING  
 % SYSTEMS  
 TURING MACHINES

SELF OSCILLATION  
 O902 1002 1003  
 GS OSCILLATIONS  
 #SELF OSCILLATION  
 RT FEEDBACK AMPLIFIERS  
 POSITIVE FEEDBACK  
 TRANSFER FUNCTIONS

SELF PROPAGATION  
 3407  
 GS DIFFUSION  
 #SELF PROPAGATION  
 TRANSMISSION  
 #SELF PROPAGATION  
 RT % PROPAGATION

SELF REGULATING  
 USE AUTOMATIC CONTROL

SELF REPAIRING DEVICES  
 O503 O801 O802 1003  
 RT % AUTOMATION  
 % DEVICES  
 MAINTENANCE

SELF SEALING  
 O202 O504 O602 3110  
 GS SEALING  
 #SELF SEALING  
 RT FLIGHT SAFETY  
 FUEL SYSTEMS  
 RUPTURING  
 SUPPORT SYSTEMS

SELF SHADOWING  
0705  
RT  
LARGE SPACE STRUCTURES  
SHADOWS  
SOLAR ARRAYS

SELF STIMULATION  
0410 3407  
RT  
MOTIVATION  
REINFORCEMENT (PSYCHOLOGY)

SELF SUBTRACTION HOLOGRAPHY  
USE HOLOGRAPHIC SUBTRACTION

SELF SUSTAINED EMISSION  
1002 1003 2306 2401 2406  
GS  
EMISSION  
#SELF SUSTAINED EMISSION  
RT  
ELECTRON EMISSION  
LIGHT EMISSION  
PARTICLE EMISSION  
STIMULATED EMISSION

SELF TESTS  
0201 1108 1505 3406 3501  
RT  
AUTOMATIC TEST EQUIPMENT  
AVIONICS  
CHECKOUT  
ELECTRONIC EQUIPMENT TESTS  
FAIL-SAFE SYSTEMS  
% TESTS

SELSYNS (TRADEMARK)  
USE SERVOMOTORS

SEM (MICROSCOPY)  
USE SCANNING ELECTRON MICROSCOPY

SEMANTICS  
0703 3405  
GS  
LINGUISTICS  
#SEMANTICS  
RT  
COMMUNICATION THEORY  
GRAMMARS  
LANGUAGES  
MESSAGE PROCESSING  
MESSAGES  
NATURAL LANGUAGE PROCESSING  
NOMENCLATURES  
ORTHOGRAPHY  
PARSING ALGORITHMS  
PREDICATE LOGIC  
PSYCHOLINGUISTICS  
SENTENCES

SPEECH  
SYLLABLES  
SYMBOLS  
SYNTAX  
WORDS (LANGUAGE)

SEMICIRCULAR CANALS  
0405 0408  
GS  
ANATOMY  
.SENSE ORGANS  
.EAR  
...LABYRINTH  
...#SEMICIRCULAR CANALS  
RT  
EARDRUMS  
MIDDLE EAR  
OTOLITH ORGANS  
VESTIBULES

SEMICONDUCTING FILMS  
2602  
RT  
AMORPHOUS SEMICONDUCTORS  
AMORPHOUS SILICON  
DIAMOND FILMS  
ENERGY ABSORPTION FILMS  
% FILMS  
SUPERCONDUCTING FILMS  
THICK FILMS  
THIN FILMS

SEMICONDUCTOR DEVICES  
0906  
GS  
ELECTRONIC EQUIPMENT  
.SOLID STATE DEVICES  
#SEMICONDUCTOR DEVICES  
...AVALANCHE DIODES  
...CRYOSAR  
...BARRITT DIODES  
...CHARGE TRANSFER DEVICES  
...BUCKET BRIGADE DEVICES  
...CHARGE COUPLED DEVICES  
...CHARGE INJECTION DEVICES  
...GERMANIUM DIODES  
...HETEROJUNCTION DEVICES  
...HIGH ELECTRON MOBILITY TRANSISTORS  
...MODFETS  
...JUNCTION DIODES  
...MIM DIODES  
...STEP RECOVERY DIODES  
...LIGHT EMITTING DIODES  
...METAL OXIDE SEMICONDUCTORS  
...CMOS  
...ITO (SEMICONDUCTORS)  
...SOS (SEMICONDUCTORS)  
...MIM (SEMICONDUCTORS)

MIS (SEMICONDUCTORS)  
MSM (SEMICONDUCTORS)  
NDM SEMICONDUCTOR DEVICES  
NEURISTORS  
PARAMETRIC DIODES  
PHOTODIODES  
PHOTOVOLTAIC CELLS  
SOLAR CELLS  
...VERTICAL JUNCTION SOLAR CELLS  
SCHOTTKY DIODES  
SEMICONDUCTOR LASERS  
ALUMINUM GALLIUM ARSENIDE LASERS  
...GALLIUM ARSENIDE LASERS  
...QUANTUM WELL LASERS  
SOI (SEMICONDUCTORS)  
THERMISTORS  
THYRISTORS  
SILICON CONTROLLED RECTIFIERS  
TRANSFERRED ELECTRON DEVICES  
TRANSISTOR AMPLIFIERS  
TRANSISTORS  
BIPOLAR TRANSISTORS  
FIELD EFFECT TRANSISTORS  
CHARGE FLOW DEVICES  
JFET  
MODFETS  
HIGH ELECTRON MOBILITY TRANSISTORS  
MODFETS  
JUNCTION TRANSISTORS  
JFET  
PHOTOTRANSISTORS  
SILICON TRANSISTORS  
SOS (SEMICONDUCTORS)  
TRAPATT DEVICES  
VARACTOR DIODES  
VARISTORS  
BARRIER LAYERS  
BUBBLE TECHNIQUE  
CHIPS (MEMORY DEVICES)  
CRYSTAL RECTIFIERS  
DIFFUSION ELECTRODES  
DIFFUSION LENGTH DIODES  
GUNN DIODES  
GUNN EFFECT  
HALL EFFECT  
HYBRID CIRCUITS  
ION IMPLANTATION  
JUNCTIONS  
MICROMINIATURIZATION  
MODULATION DOPING  
MOLECULAR ELECTRONICS  
ORGANIC SEMICONDUCTORS



## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

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SEMIEMPIRICAL EQUATIONS
1902
RT  ALGEBRA
    % EQUATIONS
    PARAMETERIZATION

SEMIMETALS
USE  METALLOIDS

SEMIREGULAR VARIABLE STARS
2306 3001 3006
GS  CELESTIAL BODIES
    . STARS
    .. VARIABLE STARS
    .. #SEMIREGULAR VARIABLE STARS
RT  IRREGULAR VARIABLE STARS
    PERIODIC VARIATIONS

SEMISOLIDS
1704 2311
RT  PLASTIC PROPERTIES
    THIXOTROPY
    VISCOUS FLUIDS

SEMISPAN MODELS
0101 0102 0201
GS  MODELS
    #SEMISPAN MODELS
RT  AERODYNAMIC CONFIGURATIONS
    AIRCRAFT MODELS
    SCALE MODELS
    WIND TUNNEL MODELS

SENARMONT POLARISCOPES
1409 2306 2310 2402
GS  MEASURING INSTRUMENTS
    . POLARISCOPES
    . #SENARMONT POLARISCOPES
    OPTICAL EQUIPMENT
    . POLARISCOPES
    . #SENARMONT POLARISCOPES
RT  LASERS
    OPTICAL MEASURING INSTRUMENTS

SENDERS
USE  TRANSMITTERS

SENECA AIRCRAFT
USE  PA-34 SENECA AIRCRAFT

SENEGAL
1305
GS  NATIONS
    #SENEGAL

RT  AFRICA
SENSE ORGANS
0404
GS  ANATOMY
    #SENSE ORGANS
    . BARORECEPTORS
    . CHEMORECEPTORS
    . .EAR
    . . .EARDRUMS
    . . .EUSTACHIAN TUBES
    . . .LABYRINTH
    . . .COCHLEA
    . . . .CORTI ORGAN
    . . . .OTOLITH ORGANS
    . . . .SEMICIRCULAR CANALS
    . . . .VESTIBULES
    . . .MIDDLE EAR
    . .EYE (ANATOMY)
    . . .CHOROID MEMBRANES
    . . .CONJUNCTIVA
    . . .CORNEA
    . . .OCULOMOTOR NERVES
    . . .PUPILS
    . . .RETINA
    . . . .FOVEA
    . . .GRAVIRECEPTORS
    . . .OTOLITH ORGANS
    . . .MECHANORECEPTORS
    . . .PHOTORECEPTORS
    . . .PROPRIOCEPTORS
    . . .THERMORECEPTORS
RT  FINGERS
    HEAD (ANATOMY)
    NERVOUS SYSTEM
    OLFACTORY PERCEPTION
    ORGANS
    PERCEPTUAL TIME CONSTANT
    RECEPTORS (PHYSIOLOGY)
    SENSITOMETRY
    SKIN (ANATOMY)

SENSES
USE  SENSORY PERCEPTION

SENSIBILITY
USE  SENSITIVITY

SENSING
USE  DETECTION

SENSITIVITY
1002 1003 1406 1409 1413 3408 3501
UF  INSENSITIVITY
    SENSIBILITY

RT  #SENSITIVITY
    .ANAPHYLAXIS
    .IMPACT RESISTANCE
    .NOTCH SENSITIVITY
    .PAIN SENSITIVITY
    .PHOTOSENSITIVITY
    . .LIGHT ADAPTATION
    . .PHOTOTROPISM
    .PROPELLANT SENSITIVITY
    .RADIATION TOLERANCE
    .SENSITOMETRY
    .SPECTRAL SENSITIVITY
    ACUITY
    ADAPTATION
    AMPLIFICATION
    AUDITORY PERCEPTION
    DYNAMIC CHARACTERISTICS
    DYNAMIC RESPONSE
    % FREQUENCY RESPONSE
    ITCHING
    PERCEPTION
    PRECISION
    RANGE (EXTREMES)
    REACTION TIME
    % RESISTANCE
    RESOLUTION
    SENSITIZING
    SHOCK RESISTANCE
    % THRESHOLDS
    THRESHOLDS (PERCEPTION)
    TOLERANCES (MECHANICS)
    TRANSFER FUNCTIONS
    TRANSIENT RESPONSE
    VISIBILITY
    VULNERABILITY

SENSITIZING
0403 0405 0408
RT  ACTIVATION
    ACTUATION
    ANAPHYLAXIS
    CORROSION PREVENTION
    SENSITIVITY

SENSITOMETRY
1406 1407 1409
GS  SENSITIVITY
    #SENSITOMETRY
RT  GRAVIRECEPTORS
    MECHANORECEPTORS
    PHOTORECEPTORS
    PHOTOSENSITIVITY
    PROPRIOCEPTORS
    RADIATION MEASUREMENT
    RECEPTORS (PHYSIOLOGY)

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                       |  |  |  |
|---------------------------------------------------------------------------------------|--|--|--|
| SENSE ORGANS<br>THERMORECEPTORS                                                       |  |  |  |
| SENSORIMOTOR PERFORMANCE                                                              |  |  |  |
| 0401 0410 0506                                                                        |  |  |  |
| GS #SENSORIMOTOR PERFORMANCE                                                          |  |  |  |
| . PSYCHOMOTOR PERFORMANCE                                                             |  |  |  |
| .. PSYCHOSOMATICS                                                                     |  |  |  |
| RT AFFERENT NERVOUS SYSTEMS                                                           |  |  |  |
| EFFERENT NERVOUS SYSTEMS                                                              |  |  |  |
| HUMAN PERFORMANCE                                                                     |  |  |  |
| HUMAN REACTIONS                                                                       |  |  |  |
| PERCEPTUAL TIME CONSTANT                                                              |  |  |  |
| PHYSIOLOGICAL TESTS                                                                   |  |  |  |
| PILOT PERFORMANCE                                                                     |  |  |  |
| REACTION TIME                                                                         |  |  |  |
| SENSORY FEEDBACK                                                                      |  |  |  |
| % SENSORS                                                                             |  |  |  |
| 1409                                                                                  |  |  |  |
| SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW) |  |  |  |
| UF PICKOFFS                                                                           |  |  |  |
| PICKUPS                                                                               |  |  |  |
| RT BIOINSTRUMENTATION                                                                 |  |  |  |
| CHARACTER RECOGNITION                                                                 |  |  |  |
| CHARGE FLOW DEVICES                                                                   |  |  |  |
| CONTOUR SENSORS                                                                       |  |  |  |
| CROP IDENTIFICATION                                                                   |  |  |  |
| DATA ACQUISITION                                                                      |  |  |  |
| ELECTRONIC TRANSDUCERS                                                                |  |  |  |
| FLIR DETECTORS                                                                        |  |  |  |
| GAS DETECTORS                                                                         |  |  |  |
| GUIDANCE SENSORS                                                                      |  |  |  |
| IMAGE VELOCITY SENSORS                                                                |  |  |  |
| LASER GYROSCOPES                                                                      |  |  |  |
| MEASURING INSTRUMENTS                                                                 |  |  |  |
| MICROWAVE SENSORS                                                                     |  |  |  |
| MULTISPECTRAL LINEAR ARRAYS                                                           |  |  |  |
| REMOTE SENSORS                                                                        |  |  |  |
| ROBOT SENSORS                                                                         |  |  |  |
| SERVOMOTORS                                                                           |  |  |  |
| TACTILE SENSORS (ROBOTICS)                                                            |  |  |  |
| TORQUE SENSORS (ROBOTICS)                                                             |  |  |  |
| TRANSDUCERS                                                                           |  |  |  |
| SENSORY DEPRIVATION                                                                   |  |  |  |
| 0401 0408 0410                                                                        |  |  |  |
| GS DEPRIVATION                                                                        |  |  |  |
| #SENSORY DEPRIVATION                                                                  |  |  |  |
| RT CONFINEMENT                                                                        |  |  |  |
| CONFINING                                                                             |  |  |  |
| MONOTONY                                                                              |  |  |  |
| PERCEPTION                                                                            |  |  |  |
| SENSORY DISCRIMINATION                                                                |  |  |  |
| 0401 0408 0502                                                                        |  |  |  |
| GS DISCRIMINATION                                                                     |  |  |  |
| #SENSORY DISCRIMINATION                                                               |  |  |  |
| .. BRIGHTNESS DISCRIMINATION                                                          |  |  |  |
| .. TACTILE DISCRIMINATION                                                             |  |  |  |
| .. VISUAL DISCRIMINATION                                                              |  |  |  |
| RT SPEECH RECOGNITION                                                                 |  |  |  |
| TIME DISCRIMINATION                                                                   |  |  |  |
| SENSORY FEEDBACK                                                                      |  |  |  |
| 0404 0408 0503                                                                        |  |  |  |
| UF FEELINGS                                                                           |  |  |  |
| GS FEEDBACK                                                                           |  |  |  |
| . BIOFEEDBACK                                                                         |  |  |  |
| . #SENSORY FEEDBACK                                                                   |  |  |  |
| RT EMOTIONAL FACTORS                                                                  |  |  |  |
| EMOTIONS                                                                              |  |  |  |
| MOODS                                                                                 |  |  |  |
| MOON ILLUSION                                                                         |  |  |  |
| NONLINEAR FEEDBACK                                                                    |  |  |  |
| PERCEPTION                                                                            |  |  |  |
| SENSORIMOTOR PERFORMANCE                                                              |  |  |  |
| SENSORY PERCEPTION                                                                    |  |  |  |
| 0401 0408 0410                                                                        |  |  |  |
| UF SENSES                                                                             |  |  |  |
| GS PERCEPTION                                                                         |  |  |  |
| #SENSORY PERCEPTION                                                                   |  |  |  |
| .. AUDITORY PERCEPTION                                                                |  |  |  |
| .. CONSCIOUSNESS                                                                      |  |  |  |
| .. EXTRASENSORY PERCEPTION                                                            |  |  |  |
| .. KINESTHESIA                                                                        |  |  |  |
| .. OLFACTORY PERCEPTION                                                               |  |  |  |
| .. PAIN                                                                               |  |  |  |
| .. PAIN SENSITIVITY                                                                   |  |  |  |
| .. PROPRIOCEPTION                                                                     |  |  |  |
| .. AUTOKINESIS                                                                        |  |  |  |
| .. TASTE                                                                              |  |  |  |
| .. TOUCH                                                                              |  |  |  |
| .. TACTILE DISCRIMINATION                                                             |  |  |  |
| .. VERTICAL PERCEPTION                                                                |  |  |  |
| .. VIBRATION PERCEPTION                                                               |  |  |  |
| .. VISUAL PERCEPTION                                                                  |  |  |  |
| .. CRITICAL FLICKER FUSION                                                            |  |  |  |
| .. SPACE PERCEPTION                                                                   |  |  |  |
| .. AUTOKINESIS                                                                        |  |  |  |
| .. VISUAL DISCRIMINATION                                                              |  |  |  |
| RT AFTERIMAGES                                                                        |  |  |  |
| ANESTHESIA                                                                            |  |  |  |
| ELECTROCUANEOUS COMMUNICATION                                                         |  |  |  |
| ITCHING                                                                               |  |  |  |
| SENSORY STIMULATION                                                                   |  |  |  |
| 0408 0410                                                                             |  |  |  |
| GS STIMULATION                                                                        |  |  |  |
| #SENSORY STIMULATION                                                                  |  |  |  |
| RT CHRONAXY                                                                           |  |  |  |
| EMOTIONAL FACTORS                                                                     |  |  |  |
| SUBLIMINAL STIMULI                                                                    |  |  |  |
| SENTENCES                                                                             |  |  |  |
| 0703                                                                                  |  |  |  |
| GS LANGUAGES                                                                          |  |  |  |
| #SENTENCES                                                                            |  |  |  |
| .. WORDS (LANGUAGE)                                                                   |  |  |  |
| ... SYLLABLES                                                                         |  |  |  |
| LINGUISTICS                                                                           |  |  |  |
| . SYNTAX                                                                              |  |  |  |
| . #SENTENCES                                                                          |  |  |  |
| ... WORDS (LANGUAGE)                                                                  |  |  |  |
| .... SYLLABLES                                                                        |  |  |  |
| RT COMMUNICATION THEORY                                                               |  |  |  |
| MESSAGES                                                                              |  |  |  |
| SEMANTICS                                                                             |  |  |  |
| SIGNAL RECEPTION                                                                      |  |  |  |
| SIGNAL TRANSMISSION                                                                   |  |  |  |
| SPEECH                                                                                |  |  |  |
| TALKING                                                                               |  |  |  |
| SENTINEL SYSTEM                                                                       |  |  |  |
| 3401                                                                                  |  |  |  |
| GS WEAPON SYSTEMS                                                                     |  |  |  |
| #SENTINEL SYSTEM                                                                      |  |  |  |
| RT ANTIMISSILE DEFENSE                                                                |  |  |  |
| ANTIMISSILE MISSILES                                                                  |  |  |  |
| CIVIL DEFENSE                                                                         |  |  |  |
| NIKE MISSILES                                                                         |  |  |  |
| SAFEGUARD SYSTEM                                                                      |  |  |  |
| SPARTAN MISSILE                                                                       |  |  |  |
| SPRINT MISSILE                                                                        |  |  |  |
| SURFACE TO AIR MISSILES                                                               |  |  |  |
| % SYSTEMS                                                                             |  |  |  |
| SEO (INDIAN SPACECRAFT)                                                               |  |  |  |
| USE INDIAN SPACECRAFT                                                                 |  |  |  |
| SEOCs (SATELLITE)                                                                     |  |  |  |
| 3107                                                                                  |  |  |  |
| GS ARTIFICIAL SATELLITES                                                              |  |  |  |
| . METEOROLOGICAL SATELLITES                                                           |  |  |  |
| . #SEOCs (SATELLITE)                                                                  |  |  |  |
| SEOS                                                                                  |  |  |  |
| USE SYNCHRONOUS EARTH OBSERVATORY                                                     |  |  |  |
| SATELLITE                                                                             |  |  |  |
| SEPAC (PAYLOAD)                                                                       |  |  |  |
| 3009 3107                                                                             |  |  |  |

|  |    |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | UF | SPACE EXPR WITH PARTICLE<br>ACCELERATORS                                                                                                                                                                                                                                                                                                                                                                          | DECONTAMINATION<br>DEGASSING<br>DEHUMIDIFICATION<br>DEHYDRATION<br>DEIONIZATION<br>DELAMINATING<br>DEMNERALIZING<br>DEOXYGENATION<br>DEPOSITION<br>DESCALING<br>DESORPTION<br>DIALYSIS<br>DIFFUSION<br>DISPERSING<br>DISSOLVING<br>DISTILLATION<br>DIVERTERS<br>% DIVISION<br>DRYING<br>ELECTRODIALYSIS<br>ELECTROSTATIC PRECIPITATORS<br>ELIMINATION<br>ELUTION<br>EVAPORATION<br>EXCHANGING<br>EXCLUSION<br>EXTERNAL STORE SEPARATION<br>EXTRACTION<br>FILTRATION<br>FLAKING<br>FLASHING (VAPORIZING)<br>FLOTATION<br>FLUSHING<br>FOAMING<br>FRACTIONATION<br>FRACTURING<br>HOMOGENIZING<br>ION EXCHANGING<br>ION EXTRACTION<br>ION STRIPPING<br>ISOLATION<br>LEACHING<br>MATERIALS RECOVERY<br>MELTING<br>MIXING<br>OSMOSIS<br>PERCOLATION<br>PHASE SEPARATION (MATERIALS)<br>POLARIZATION (CHARGE SEPARATION)<br>PRECIPITATION (CHEMISTRY)<br>PURGING<br>PURIFICATION<br>RADIOCHEMICAL SEPARATION<br>RECRYSTALLIZATION<br>REFINING |
|  | GS | PAYLOADS<br>#SEPA (PAYLOAD)                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | RT | % ACCELERATORS<br>PARTICLE ACCELERATORS<br>SPACELAB                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  |    | SEPARATED FLOW<br>O101 1201 1202 1203<br>UF FLOW SEPARATION<br>GS FLUID FLOW<br>. VISCIOUS FLOW<br>.. BOUNDARY LAYER FLOW<br>... #SEPARATED FLOW<br>.... BOUNDARY LAYER SEPARATION<br>RT CAVITATION FLOW<br>CONICAL FLOW<br>CROCCO-LEE THEORY<br>FLOW CHARACTERISTICS<br>FLOW DISTRIBUTION<br>REATTACHED FLOW<br>REVERSED FLOW<br>SEPARATION<br>% SURFACE ROUGHNESS EFFECTS<br>TURBULENCE EFFECTS<br>VORTEX FLAPS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | %  | SEPARATION<br>1201 3102 3407 3501<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | UF | SEGREGATION                                                                                                                                                                                                                                                                                                                                                                                                       | REMOVAL<br>SCRAPERS<br>SEPARATED FLOW<br>SEPARATORS<br>SETTLING<br>SHAKING<br>SHEARING<br>SIZE SEPARATION<br>SLICING<br>SOLVENT EXTRACTION<br>SORPTION<br>SPACING<br>SPLITTING<br>SPREADING<br>STAGE SEPARATION<br>STRIPPING (DISTILLATION)<br>SUBLIMATION<br>SWIRLING<br>THERMAL DIFFUSION<br>THERMOPHORESIS<br>TUMBLING MOTION<br>VAPORIZING<br>VENTING<br>WASHING<br>ZONE MELTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|  | RT | ADSORPTION<br>AERATION<br>AGGLOMERATION<br>AGITATION<br>BENEFICIATION<br>BOUNDARY LAYER SEPARATION<br>BREAKING<br>CENTRIFUGING<br>CHEMICAL FRACTIONATION<br>CHIPPING<br>CLASSIFIERS<br>CLEANING<br>COAGULATION<br>COALESCING<br>COANDA EFFECT<br>COLLOIDS<br>CONCENTRATING<br>CONDENSING<br>CRYSTALLIZATION<br>CUTTING<br>DEBONDING (MATERIALS)                                                                   | SEPARATORS<br>O302 O603 1201<br>UF BATTERY SEPARATORS<br>GS #SEPARATORS<br>. CLASSIFIERS<br>.. SIZING SCREENS<br>... THICKENERS (EQUIPMENT)<br>. DIVIDERS<br>. DRYING APPARATUS<br>. DESICCATORS<br>. DUST COLLECTORS<br>. EVAPORATORS<br>. FLUID FILTERS<br>.. AIR FILTERS<br>. PRECIPITATORS<br>.. ELECTROSTATIC PRECIPITATORS<br>. SIEVES<br>. SPIRALS (CONCENTRATORS)<br>. STILL<br>CENTRIFUGES<br>CLEANERS<br>COLUMNS (PROCESS ENGINEERING)<br>CONCENTRATING<br>CONCENTRATORS<br>CONDENSERS (LIQUEFIERS)<br>CURTAINS<br>% DIFFUSERS<br>% FILTERS                                                                                                                                                                                                                                                                                                                                                                                  |

|                                    |                           |                      |                                 |                  |                                |
|------------------------------------|---------------------------|----------------------|---------------------------------|------------------|--------------------------------|
| FLOATS                             |                           | GS                   | AUTOMATIC CONTROL               |                  | ...ASYMPTOTIC SERIES           |
| FLUIDIZED BED PROCESSORS           |                           |                      | #SEQUENTIAL CONTROL             |                  | ...CAMPBELL-HAUSDORFF SERIES   |
| FURNACES                           |                           | RT                   | ACCURACY                        |                  | ...COSINE SERIES               |
| ION EXCHANGE MEMBRANE ELECTROLYTES |                           |                      | COMPUTER PROGRAMMING            |                  | ...FOURIER SERIES              |
| MIXERS                             |                           | %                    | CONSECUTIVE EVENTS              |                  | ...PADE APPROXIMATION          |
| % SEPARATION                       |                           |                      | % CONTROL                       |                  | ...POWER SERIES                |
| SHAKERS                            |                           |                      | DATA FLOW ANALYSIS              |                  | ...TAYLOR SERIES               |
| SPACERS                            |                           |                      | NUMERICAL CONTROL               |                  | ....MACLAURIN SERIES           |
| TRAPS                              |                           |                      | SEQUENCING                      |                  | ...PROGRESSIONS                |
| VAPORIZERS                         |                           | SERGEANT MISSILES    |                                 | RT               | ...PRONY SERIES                |
| WASHERS (CLEANERS)                 |                           | 3101 3401            |                                 |                  | ...SINE SERIES                 |
| WASHERS (SPACERS)                  |                           | GS                   | MISSILES                        |                  | ABEL FUNCTION                  |
| WINDOWS (APERTURES)                |                           |                      | .SURFACE TO SURFACE MISSILES    |                  | CHEBYSHEV APPROXIMATION        |
|                                    | O405                      |                      | .#SERGEANT MISSILES             |                  | DIVERGENCE                     |
| SEPTUM                             | RT                        | RT                   | JUNO 1 LAUNCH VEHICLE           |                  | FORM FACTORS                   |
| O404                               |                           |                      | JUNO 2 LAUNCH VEHICLE           |                  | FOURIER-BESSEL TRANSFORMATIONS |
| MEDIASTINIUM                       |                           |                      | JUPITER C ROCKET VEHICLE        |                  | FUNCTION SPACE                 |
| MEMBRANES                          |                           |                      | LITTLE JOE 2 LAUNCH VEHICLE     |                  | FUNCTIONAL ANALYSIS            |
| % PARTITIONS                       |                           |                      | SOLID PROPELLANT ROCKET ENGINES |                  | GIBBS PHENOMENON               |
|                                    |                           |                      |                                 |                  | INFINITY                       |
| SEQUENCING                         |                           | SERGEANIUM           |                                 |                  | SERIES EXPANSION               |
| O802 1902 3407                     |                           | 0603 1703 2406       |                                 |                  | SUMS                           |
| RT                                 | CONSECUTIVE EVENTS        | GS                   | CHEMICAL ELEMENTS               | SERIES EXPANSION |                                |
|                                    | COORDINATION              |                      | .ACTINIDE SERIES                | 1902             |                                |
|                                    | CRITICAL PATH METHOD      |                      | ..TRANSURANIUM ELEMENTS         | GS               |                                |
|                                    | INTERRUPTION              |                      | ..#SERGIENIUM                   |                  | EXPANSION                      |
| %                                  | OPERATIONS                |                      | .NUCLIDES                       | RT               | #SERIES EXPANSION              |
| OPERATIONS RESEARCH                |                           |                      | ..ISOTOPIES                     |                  | ASYMPTOTIC SERIES              |
| PACKET SWITCHING                   |                           |                      | ...RADIOACTIVE ISOTOPIES        | %                | DIVERGENCE                     |
| PETRI NETS                         |                           |                      | ....TRANSURANIUM ELEMENTS       |                  | MATHEMATICS                    |
| PLANNING                           |                           |                      | ....#SERGIENIUM                 |                  | SERIES (MATHEMATICS)           |
| PRIORITIES                         |                           |                      | METALS                          | SEROTONIN        |                                |
| RANKING                            |                           |                      | .ACTINIDE SERIES                | O403 1808        |                                |
| SCHEDULING                         |                           |                      | ..TRANSURANIUM ELEMENTS         | GS               | AMINES                         |
| SEQUENTIAL CONTROL                 |                           |                      | ..#SERGIENIUM                   |                  | .TRYPTAMINES                   |
| SWITCHING                          |                           |                      |                                 |                  | .#SEROTONIN                    |
| SWITCHING THEORY                   |                           |                      |                                 |                  | DRUGS                          |
| TURNAROUND (STS)                   |                           | SERIES (MATHEMATICS) |                                 |                  | .VASOCONSTRICTOR DRUGS         |
|                                    |                           | 1902 1903            |                                 |                  | .#SEROTONIN                    |
| SEQUENTIAL ANALYSIS                |                           | GS                   | ANALYSIS (MATHEMATICS)          |                  | ORGANIC COMPOUNDS              |
| O802 1902 1903 1905                |                           |                      | .CALCULUS                       |                  | #SEROTONIN                     |
| GS                                 | STATISTICAL ANALYSIS      |                      | .#SERIES (MATHEMATICS)          |                  |                                |
| #SEQUENTIAL ANALYSIS               |                           |                      | ...ASYMPTOTIC SERIES            | SERPENTINE       |                                |
| QUALITY CONTROL                    |                           |                      | ...CAMPBELL-HAUSDORFF SERIES    | 1806 1902        |                                |
| SAMPLING                           |                           |                      | ...COSINE SERIES                | GS               | MINERALS                       |
|                                    | SEQUENTIAL COMPUTERS      |                      | ...FOURIER SERIES               |                  | #SERPENTINE                    |
| O801 O802 1504                     |                           |                      | ...PADE APPROXIMATION           | RT               | ASBESTOS                       |
| GS                                 | DATA PROCESSING EQUIPMENT |                      | ...POWER SERIES                 |                  | CHROMITES                      |
| .COMPUTERS                         |                           |                      | ...TAYLOR SERIES                |                  | ROCKS                          |
| ..DIGITAL COMPUTERS                |                           |                      | ....MACLAURIN SERIES            |                  | SOILS                          |
| ..#SEQUENTIAL COMPUTERS            |                           |                      | ...PROGRESSIONS                 |                  |                                |
|                                    |                           |                      | ...PRONY SERIES                 |                  |                                |
|                                    |                           |                      | ...SINE SERIES                  | SERRATTIA        |                                |
| SEQUENTIAL CONTROL                 |                           |                      | .REAL VARIABLES                 | O407             |                                |
| O802 O803 1003                     |                           |                      | .#SERIES (MATHEMATICS)          | GS               | MICROORGANISMS                 |

```

.BACTERIA
.#SERRATIA

SERT (ROCKET TESTS)
USE SPACE ELECTRIC ROCKET TESTS

SERT 1 SPACECRAFT
2803 3106 3409
RT ELECTRIC PROPULSION
ELECTRIC ROCKET ENGINES
ENGINE TESTS
SPACE ELECTRIC ROCKET TESTS
% SPACECRAFT

SERT 2 SPACECRAFT
2803 3106 3409
RT ELECTRIC PROPULSION
ELECTRIC ROCKET ENGINES
ENGINE TESTS
SPACE ELECTRIC ROCKET TESTS
% SPACECRAFT

SERUMS
0405 0412
GS #SERUMS
.INOCULUM
RT ANTISERUMS
% FLUIDS
PROTEINS

SERVICE LIFE
1504
UF MACHINE LIFE
GS LIFE (DURABILITY)
#SERVICE LIFE
RT ACCELERATED LIFE TESTS
% EQUIPMENT
FATIGUE LIFE
MAINTENANCE
RETIREMENT FOR CAUSE

SERVICE MODULES
1410 3106
GS #SERVICE MODULES
SPACECRAFT COMPONENTS
#SERVICE MODULES
RT APOLLO SPACECRAFT
COMMAND MODULES
SPACECRAFT DOCKING MODULES
SPACECRAFT MODULES

SERVICES
1102 1103 1504
GS #SERVICES

.MEDICAL SERVICES
.METEOROLOGICAL SERVICES
RT % FOOD
GOVERNMENT PROCUREMENT
INVENTORY MANAGEMENT
LOGISTICS
LOGISTICS MANAGEMENT
MATERIALS HANDLING
PERSONNEL
PROCUREMENT
PROCUREMENT MANAGEMENT
PRODUCTS
SITE SELECTION
SUPPORT SYSTEMS
TRANSPORTATION
UTILITIES

SERVOAMPLIFIERS
0303 0904 1003 1201 1409 3501
GS AMPLIFIERS
#SERVOAMPLIFIERS
CONTROL EQUIPMENT
#SERVOAMPLIFIERS
CONTROLLERS
.SERVOMECHANISMS
#SERVOAMPLIFIERS
FEEDBACK AMPLIFIERS
FLY BY TUBE CONTROL
SERVOCONTROL

SERVOCONTROL
0203 1003 1201 1409 2102 3501
UF SERVOSTABILITY CONTROL
RT AEROSERVOELASTICITY
AIRCRAFT HYDRAULIC SYSTEMS
AUTOMATIC CONTROL
% CONTROL
CONTROL MOMENT GYROSCOPES
CONTROL THEORY
DIGITAL COMMAND SYSTEMS
FEEDBACK CONTROL
HYDRAULIC EQUIPMENT
MANIPULATORS
MANUAL CONTROL
OFF-ON CONTROL
PNEUMATIC EQUIPMENT
PROPORTIONAL CONTROL
REMOTE CONTROL
ROCKET ENGINE CONTROL
SERVOAMPLIFIERS
SERVOMECHANISMS
SERVOMOTORS
STEPPING MOTORS
TURBOJET ENGINE CONTROL
VISUAL CONTROL

SERVOMECHANISMS
0203 1003 1201 1410 1504 2102 3501
GS CONTROLLERS
#SERVOMECHANISMS
..SERVOAMPLIFIERS
..SERVOMOTORS
RT ACTIVE CONTROL
ACTUATORS
AIRCRAFT HYDRAULIC SYSTEMS
AUTOMATIC CONTROL
AUTOMATIC CONTROL VALVES
% AUTOMATION
% CONTROL
CONTROL MOMENT GYROSCOPES
ELECTRIC MOTORS
FEEDBACK CONTROL
HYDRAULIC EQUIPMENT
PNEUMATIC EQUIPMENT
RADAR EQUIPMENT
REMOTE CONTROL
ROBOTS
SELF ALIGNMENT
SERVOCONTROL
STEPPING MOTORS
TACTILE SENSORS (ROBOTICS)
TORQUE SENSORS (ROBOTICS)

SERVOMOTORS
1003 1409 1504
UF MAGNESYN (TRADEMARK)
SELSYNS (TRADEMARK)
SERVOS
CONTROLLERS
.SERVOMECHANISMS
.SERVOMOTORS
MOTORS
#SERVOMOTORS
ACTUATORS
AMPLIDYNES
AUTOMATIC CONTROL
ELECTRIC MOTORS
HELIOSTATS
% ROTATING ELECTRICAL MACHINES
% SENSORS
SERVOCONTROL
SLEWING
SYNCHRONIZERS
TORQUE MOTORS

SERVOS
USE SERVOMOTORS

SERVOSTABILITY CONTROL
USE SERVOCONTROL

```

## NASA THESAURUS HIERARCHICAL UPDATE

SES USE SURFACE EFFECT SHIPS

SES (SHUTTLE)  
USE SHUTTLE ENGINEERING SIMULATOR

```

SET      1902 1905
          SN   (EXCLUDES SET THEORY)
          GS   MECHANICAL PROPERTIES
              #SET
          RT   DEFORMATION
              SHEAR PROPERTIES

```

```

SET THEORY
1902 1905
UF SUBSETS (MATHEMATICS)
GS MATHEMATICAL LOGIC
#SET THEORY
..BOREL SETS
..EQUIVALENCE
..THRESHOLD LOGIC
RT BOOLEAN ALGEBRA
BRANCHING (MATHEMATICS)
COMBINATORIAL ANALYSIS
% CONJUNCTION

```

- FIBONACCI NUMBERS
- FRACTALS
- FUZZY SETS
- FUZZY SYSTEMS
- GRAPH THEORY
- HOMOTROPY
- HYPERTPLANES
- LATTICES (MATHEMATICS)
- LEBESGUE THEOREM
- ORLICZ SPACE
- PERMUTATIONS
- % SPACE
- SUBDIVISIONS
- SUBGROUPS
- % THEORIES

```
SETI
USE PROJECT SETI
```

% SETTING  
1504 1507 3305  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT ADJUSTING  
COAGULATION  
CURING  
HARDENING (MATERIALS)

POLYMERIZATION  
POSITIONING  
SOLIDIFICATION

SETTLING  
O601 O602 1202  
RT  
ACCUMULATIONS  
AGGLOMERATION  
AGITATION  
BENEFICIATION  
COAGULATION  
COALESCING  
CONCENTRATING  
CRYSTALLIZATION  
DEPOSITION  
EFFLUENTS  
FLOCCULATING  
FLOTATION  
PARTICLE MOTION  
PRECIPITATION (CHEMISTRY)  
% PROCESSING  
% SEPARATION  
SIZE SEPARATION  
STOKES LAW (FLUID MECHANICS)  
SUBSIDENCE  
WATER TREATMENT

SETUPS  
0702  
RT MACHINING  
TOOLING

SEVERE STORMS OBSERVING SATELLITE  
USE STORMSAT SATELLITE

SEWAGE  
0505 3404  
GS WASTES  
#SEWAGE

RT  
..SOLID WASTES  
ACTIVATED SLUDGE  
EFFLUENTS  
ENVIRONMENT EFFECTS  
HUMAN WASTES  
LIQUID WASTES  
METABOLIC WASTES  
ORGANIC WASTES (FUEL  
SEWERS  
WASTE DISPOSAL  
WATER TREATMENT

SEWAGE TREATMENT  
O505  
GS WASTE TREATMENT  
#SEWAGE TREATMENT

RT  
AEROBES  
ANAEROBES  
CHEMICAL STERILIZATION  
FILTRATION  
MODULAR INTEGRATED UTILITY SYSTEM  
PURIFICATION  
SEDIMENTS  
SLUDGE  
% TREATMENT  
WASTE DISPOSAL

|                  |
|------------------|
| SEWERS           |
| O905             |
| GS PIPELINES     |
| # SEWERS         |
| RT DRAINAGE      |
| EFFLUENTS        |
| GARBAGE          |
| HUMAN WASTES     |
| METABOLIC WASTES |
| SANITATION       |
| SEWAGE           |
| WASTE DISPOSAL   |
| WASTES           |

SEWING  
1504  
RT  
1811  
BINDING  
%  
JOINING  
NEEDLES  
WEAVING

SEX  
O404 O408  
RT % DRIVES  
FEMALES  
MALES  
SEX FACTOR

SEX FACTOR  
O4O4 O4O8  
RT FEMALES  
MALES  
PHYSIOLOGICAL FACTORS  
PSYCHOLOGICAL FACTORS  
SEX  
SEX GLANDS

SEX GLANDS  
O4Q4  
GS  
ANATOMY  
. GENITOURINARY SYSTEM  
.. REPRODUCTIVE SYSTEMS  
... #SEX GLANDS  
.... GONADS

```

.....OVARIES
.....TESTES
.....PROSTATE GLAND
.....GLANDS (ANATOMY)
.#SEX GLANDS
...GONADS
...OVARIES
...TESTES
...PROSTATE GLAND
RT  ESTROGENS
    REPRODUCTION (BIOLOGY)
    SEX FACTOR

SEXTANTS
1406 2104 3001
GS  MEASURING INSTRUMENTS
    .OPTICAL MEASURING INSTRUMENTS
    .#SEXTANTS
    OPTICAL EQUIPMENT
    .OPTICAL MEASURING INSTRUMENTS
    .#SEXTANTS
    NAVIGATION AIDS
    POSITION INDICATORS
    STADIOMETERS
    THEODOLITES
    TRANSITS

SEYCHELLES
1305
GS  LANDFORMS
    .ISLANDS
    .#SEYCHELLES
    NATIONS
    #SEYCHELLES
RT  AFRICA
    INDIAN OCEAN

SEYFERT GALAXIES
3001 3009
GS  CELESTIAL BODIES
    .GALAXIES
    ..ACTIVE GALAXIES
    ..#SEYFERT GALAXIES
RT  ACTIVE GALACTIC NUCLEI
    BLAZARS
    GALACTIC NUCLEI
    INFRARED RADIATION
    LINE SPECTRA
    LUMINOUS INTENSITY
    MARKARIAN GALAXIES
    SPIRAL GALAXIES
    STELLAR SPECTRA
    ULTRAVIOLET RADIATION

SFAR

.....OVARIES
.....TESTES
.....PROSTATE GLAND
.....GLANDS (ANATOMY)
.#SEX GLANDS
...GONADS
...OVARIES
...TESTES
...PROSTATE GLAND
RT  ESTROGENS
    REPRODUCTION (BIOLOGY)
    SEX FACTOR

SEXTANTS
1406 2104 3001
GS  MEASURING INSTRUMENTS
    .OPTICAL MEASURING INSTRUMENTS
    .#SEXTANTS
    OPTICAL EQUIPMENT
    .OPTICAL MEASURING INSTRUMENTS
    .#SEXTANTS
    NAVIGATION AIDS
    POSITION INDICATORS
    STADIOMETERS
    THEODOLITES
    TRANSITS

SEYCHELLES
1305
GS  LANDFORMS
    .ISLANDS
    .#SEYCHELLES
    NATIONS
    #SEYCHELLES
RT  AFRICA
    INDIAN OCEAN

SEYFERT GALAXIES
3001 3009
GS  CELESTIAL BODIES
    .GALAXIES
    ..ACTIVE GALAXIES
    ..#SEYFERT GALAXIES
RT  ACTIVE GALACTIC NUCLEI
    BLAZARS
    GALACTIC NUCLEI
    INFRARED RADIATION
    LINE SPECTRA
    LUMINOUS INTENSITY
    MARKARIAN GALAXIES
    SPIRAL GALAXIES
    STELLAR SPECTRA
    ULTRAVIOLET RADIATION

SFAR

USE  SOUND FIXING AND RANGING
SFERICS
USE  ATMOSPHERICS

SGEMP
USE  SYSTEM GENERATED ELECTROMAGNETIC
    PULSES

SGR (NUCLEAR REACTORS)
USE  SODIUM GRAPHITE REACTORS

SH WAVES
1202 1203 2603 3203
UF  HORIZONTALLY POLARIZED SHEAR WAVES
GS  ELASTIC WAVES
    .S WAVES
    .#SH WAVES
RT  NONDESTRUCTIVE TESTS
    SEISMIC WAVES
    TRANSVERSE WAVES
    ULTRASONIC TESTS
    % WAVES

SH-3 HELICOPTER
0206
UF  HSS-2 HELICOPTER
    SEA KING HELICOPTER
    SIKORSKY HSS-2 HELICOPTER
GS  ANTISUBMARINE WARFARE AIRCRAFT
    #SH-3 HELICOPTER
    SIKORSKY AIRCRAFT
    #SH-3 HELICOPTER
    TRANSPORT AIRCRAFT
    #SH-3 HELICOPTER
    V/STOL AIRCRAFT
    .ROTARY WING AIRCRAFT
    ..HELICOPTERS
    ...MILITARY HELICOPTERS
RT  S-61 HELICOPTER
    SH-4 HELICOPTER

SH-4 HELICOPTER
0206
GS  ANTISUBMARINE WARFARE AIRCRAFT
    #SH-4 HELICOPTER
    SIKORSKY AIRCRAFT
    #SH-4 HELICOPTER
    TRANSPORT AIRCRAFT
    #SH-4 HELICOPTER
    V/STOL AIRCRAFT
    .ROTARY WING AIRCRAFT
    ..HELICOPTERS
    ...MILITARY HELICOPTERS

SHACKLETON BOMBER
0207
GS  ATTACK AIRCRAFT
    .BOMBER AIRCRAFT
    .#SHACKLETON BOMBER
    HAWKER SIDDELEY AIRCRAFT
    #SHACKLETON BOMBER
    MONOPLANES
    #SHACKLETON BOMBER

SHADES
0702 1002 1413
RT  LOUVERS
    SHIELDING
    % SHUTTERS

SHADOWGRAPH PHOTOGRAPHY
0102 1202 1203 1407 3501
UF  SHADOWGRAPHS
    SPARK SHADOWGRAPH PHOTOGRAPHY
    IMAGERY
    #SHADOWGRAPH PHOTOGRAPHY
    ..SCHLIEREN PHOTOGRAPHY
    PHOTOGRAPHY
    #SHADOWGRAPH PHOTOGRAPHY
    ..SCHLIEREN PHOTOGRAPHY
    BLACK AND WHITE PHOTOGRAPHY
    COLOR PHOTOGRAPHY
    FLOW VISUALIZATION
    WIND TUNNEL MODELS

SHADOWGRAPHS
USE  SHADOWGRAPH PHOTOGRAPHY

SHADOWS
0705 2306 2402 2902
GS  #SHADOWS
    .LUNAR SHADOW
    .PENUMBRAS
RT  CLOUD COVER
    CLOUDS (METEOROLOGY)
    DARKNESS
    ILLUMINATING
    LIGHT (VISIBLE RADIATION)
    NIGHT
    SELF SHADOWING
    UMBRAS

SHAFTS (MACHINE ELEMENTS)
0202 1504
UF  AXLES

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## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

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SHAPERS
1504
GS
TOOLS
.MACHINE TOOLS
.#SHAPERS
RT GRINDING MACHINES
MILLING MACHINES

SHAPES
1902
UF CURVED SURFACES
FORM
GS #SHAPES
.CONVEXITY
.ELLIPTICITY
.FLATNESS
.LINE SHAPE
.OGEE SHAPE
.ROSETTE SHAPES
.T SHAPE
RT ASYMMETRY
CONCAVITY
CONTOUR SENSORS
CONTOURS
CORNERS
% CROSS SECTIONS
CURVATURE
CURVED PANELS
GEODES
GEOMETRY
MORPHOLOGY
OBLATE SPHEROIDS
PLANFORMS
% PROFILES
PROFILOMETERS
PROLATENESS
% SURFACE GEOMETRY
SYMMETRY
TOPOLOGY

SHARKS
O402
GS ANIMALS
.VERTEBRATES
..FISHES
..#SHARKS

SHARP LEADING EDGES
O101 O104 1202 1203
GS EDGES
.LEADING EDGES
.#SHARP LEADING EDGES
RT AIRFOILS
FOREBODIES
TRAILING EDGES

% SHARPNESS
O705 O710 O902
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT CLARITY
CONTRAST
PRECISION

SHATTER CONES
1306
GS CONES
#SHATTER CONES
ROCKS
RT #SHATTER CONES
CARBONACEOUS ROCKS
CRUSTAL FRACTURES
FORMATIONS
GEOLOGY
GEOMORPHOLOGY
METEORITE COLLISIONS
METEORITE CRATERS
SEDIMENTARY ROCKS
SHOCK LOADS
STRIATION
STRUCTURAL PROPERTIES (GEOLOGY)

SHATTERING
USE FRAGMENTATION
SHAWNEE HELICOPTER
USE CH-21 HELICOPTER

% SHEAR
1202 1504 2311 3203 3407
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT DILATATIONAL WAVES
SHEARING
SHEARS

SHEAR CREEP
2311 2601 3203
GS MECHANICAL PROPERTIES
.CREEP PROPERTIES
.#SHEAR CREEP
RT PLASTIC DEFORMATION
TENSILE CREEP

SHEAR DISTURBANCES
USE S WAVES
SHEAR FATIGUE

SHEAR FLOW
1202 1203 3304
GS FLUID FLOW
#SHEAR FLOW
RT COAXIAL FLOW
CORE FLOW
CREEP PROPERTIES
% FLOW
GRAZING FLOW
KOLMOGOROV THEORY
KROOK EQUATION
MIXING LENGTH FLOW THEORY
PLASTIC FLOW
RICHARDSON NUMBER
STRATIFIED FLOW

SHEAR LAYERS
O101 O102 1202 1203
UF CHAPMAN SHEAR LAYER
RT BOUNDARY LAYERS
EARTH IONOSPHERE
% LAYERS
MIXING LAYERS (FLUIDS)
RIBBLETS
SHOCK LAYERS
SHOCK WAVE CONTROL
% TRANSITION LAYERS

SHEAR PROPERTIES
1202
GS MECHANICAL PROPERTIES
#SHEAR PROPERTIES
.SHEAR STRENGTH
RT CREEP PROPERTIES
DUCTILITY
FATIGUE (MATERIALS)
HOOKES LAW
HYSTERESIS
IMPACT STRENGTH
MODULUS OF ELASTICITY
% PROPERTIES
RESILIENCE
SET
STRESS RELAXATION
STRESS-STRAIN DIAGRAMS
STRESSES
TEMPERATURE INVERSIONS
TOUGHNESS

SHEAR STRAIN
O101 1202 3203 3204
RT MECHANICAL PROPERTIES
STRUCTURAL STRAIN

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# NASA THESAURUS HIERARCHICAL UPDATE

## TORSIONAL VIBRATION

SHEAR STRENGTH  
 O101 0102 1202 2601 3203  
 GS MECHANICAL PROPERTIES  
 .SHEAR PROPERTIES  
 .#SHEAR STRENGTH  
 RT COMPRESSIVE STRENGTH  
 FIBER STRENGTH  
 HIGH STRENGTH  
 INTERFACIAL ENERGY  
 % STRENGTH  
 TENSILE STRENGTH

SHEAR STRESS  
 1202  
 UF SHEAR FATIGUE  
 SHEARING STRESS  
 GS STRESSES  
 #SHEAR STRESS  
 ..TORSIONAL STRESS  
 INTERLAMINAR STRESS  
 RT MECHANICAL PROPERTIES  
 TRANSVERSE LOADS

SHEAR WAVES  
 USE S WAVES

SHEARING  
 1504  
 GS CUTTING  
 #SHEARING  
 RT BLANKING (CUTTING)  
 COLD WORKING  
 FAILURE  
 FAILURE MODES  
 HOT WORKING  
 LOADS (FORCES)  
 METAL CUTTING  
 METAL WORKING  
 % SEPARATION  
 % SHEAR  
 SHEARS  
 STAMPING  
 STRUCTURAL STRAIN

SHEARING STRESS  
 USE SHEAR STRESS

SHEARS  
 1504  
 GS CUTTERS  
 #SHEARS  
 TOOLS  
 #SHEARS

RT MACHINE TOOLS  
 SAWS  
 % SHEAR  
 SHEARING

SHEATHS  
 2501 2502  
 GS #SHEATHS  
 .ION SHEATHS  
 .PLASMA SHEATHS  
 RT % CASING  
 ENCAPSULATING  
 FAIRINGS  
 JACKETS  
 LININGS  
 PROTECTORS  
 ROOFS  
 WALLS

SHEDDING  
 1504 1507 1811  
 RT EJECTION  
 MOLTING  
 PEELING  
 VORTEX SHEDDING

SHEDS  
 1406 2202 2405  
 RT SHELTERS

SHEEP  
 O402  
 GS ANIMALS  
 .VERTEBRATES  
 .MAMMALS  
 ..#SHEEP  
 RT LIVESTOCK  
 WOOL

SHEET METAL  
 USE METAL SHEETS

SHEET MOLDING COMPOUNDS  
 1809 1810 3202  
 GS MOLDING MATERIALS  
 #SHEET MOLDING COMPOUNDS  
 RT COMPOSITE MATERIALS  
 COMPOSITE STRUCTURES  
 FIBER COMPOSITES  
 GRAPHITE-EPOXY COMPOSITES  
 MOLDS  
 PLASTICS  
 POLYMER MATRIX COMPOSITES  
 RESIN MATRIX COMPOSITES  
 % SHEETS

% SHEETS  
 1504 1704 2304 3203  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT COATINGS  
 CURRENT SHEETS  
 ELASTIC SHEETS  
 FABRICS  
 FLAT PLATES  
 LAMINATES  
 MEMBRANE STRUCTURES  
 MEMBRANES  
 METAL FOILS  
 METAL SHEETS  
 MULTILAYER INSULATION  
 NEUTRAL SHEETS  
 PANELS  
 PAPERS  
 POLYMERIC FILMS  
 SHEET MOLDING COMPOUNDS  
 THICK PLATES  
 THIN PLATES  
 VORTEX SHEETS  
 VORTEX SHEETS  
 WEBS (SHEETS)

## SHELL ANODES

O604  
 GS ELECTRODES  
 .ANODES  
 .#SHELL ANODES  
 RT HEAT MEASUREMENT

SHELL GALAXIES  
 3001 3009  
 GS CELESTIAL BODIES  
 .GALAXIES  
 .#SHELL GALAXIES  
 RT ELLIPTICAL GALAXIES  
 GALACTIC STRUCTURE  
 INTERACTING GALAXIES

## SHELL STABILITY

O102 3203  
 GS MECHANICAL PROPERTIES  
 .DIMENSIONAL STABILITY  
 ..STRUCTURAL STABILITY  
 ..#SHELL STABILITY  
 STABILITY  
 .STATIC STABILITY  
 ..DIMENSIONAL STABILITY  
 ...STRUCTURAL STABILITY  
 ...#SHELL STABILITY

RT BUCKLING  
 FLUID FILLED SHELLS  
 LIQUID FILLED SHELLS  
 ORTHOTROPIC SHELLS  
 PLASTIC SHELLS  
 REINFORCED SHELLS  
 SHALLOW SHELLS

SHELL STARS  
 3001 3009  
 GS CELESTIAL BODIES  
 . STARS  
 .. PECULIAR STARS  
 .. #SHELL STARS  
 STELLAR ENVELOPES

RT  
 SHELL THEORY  
 2401 2405  
 RT PERFORATED SHELLS  
 SELF CONSISTENT FIELDS  
 SHALLOW SHELLS  
 % THEORIES

SHELLFISH  
 0402  
 RT COASTAL WATER  
 MARINE BIOLOGY  
 MARINE ENVIRONMENTS  
 MARINE RESOURCES  
 MOLLUSKS

SHELLS (STRUCTURAL FORMS)  
 1504 1902 2311 2405 3202 3203  
 GS #SHELLS (STRUCTURAL FORMS)  
 . ANISOTROPIC SHELLS  
 . CIRCULAR SHELLS  
 . CONICAL SHELLS  
 . CORRUGATED SHELLS  
 . CYLINDRICAL SHELLS  
 . DOMES (STRUCTURAL FORMS)  
 . . RADOMES  
 . ELASTIC SHELLS  
 . FLUID FILLED SHELLS  
 . . LIQUID FILLED SHELLS  
 . HEMISPHERICAL SHELLS  
 . METAL SHELLS  
 . ORTHOTROPIC SHELLS  
 . PERFORATED SHELLS  
 . PLASTIC SHELLS  
 . REINFORCED SHELLS  
 . SHALLOW SHELLS  
 . SPHERICAL SHELLS  
 . . SPHERICAL CAPS  
 . THIN WALLED SHELLS  
 . TOROIDAL SHELLS

RT AIRCRAFT STRUCTURES  
 ARCHES  
 BAYS (STRUCTURAL UNITS)  
 % CAPSULES  
 COVERINGS  
 COWLINGS  
 ENCLOSURES  
 FAIRINGS  
 HOUSINGS  
 HULLS (STRUCTURES)  
 ISOTENSOID STRUCTURES  
 MEMBRANE STRUCTURES  
 MEMBRANES  
 MONOCOQUE STRUCTURES  
 NACELLES  
 PRESSURE VESSEL DESIGN  
 PROTUBERANCES  
 ROCKET ENGINE CASES  
 SKIN (STRUCTURAL MEMBER)  
 WALLS

SHELTERS  
 0507 3401 3404  
 GS #SHELTERS  
 . LUNAR SHELTERS  
 RT BUILDINGS  
 CIVIL DEFENSE  
 ENVIRONMENTAL ENGINEERING  
 HABITABILITY  
 SHEDS  
 STARSITE PROGRAM  
 SURVIVAL

% SHELVES  
 1305 1103 1305 1306  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)

RT BEDROCK  
 CASES (CONTAINERS)  
 CLIFFS  
 CONTINENTAL SHELVES  
 RACKS (FRAMES)  
 REEFS

SHENANDOAH VALLEY (VA)  
 1305  
 GS VALLEYS  
 #SHENANDOAH VALLEY (VA)  
 RT RIVER BASINS  
 VIRGINIA

SHERGOTTITES  
 1306 3005  
 GS CELESTIAL BODIES

RT METEORITES  
 . STONY METEORITES  
 . . . ACHONDRITES  
 . . . #SHERGOTTITES  
 CHASSIGNITES  
 NAKHLITES

RT  
 SHIELDING  
 2202 3303 3305 3407 3501  
 GS #SHIELDING  
 . ELECTROMAGNETIC SHIELDING  
 . . RADIO FREQUENCY SHIELDING  
 . ELECTROSTATIC SHIELDING  
 . HEAT SHIELDING  
 . . REENTRY SHIELDING  
 . . REUSABLE HEAT SHIELDING  
 . MAGNETIC SHIELDING  
 . . RADIATION SHIELDING  
 . . SOLAR RADIATION SHIELDING  
 . SPACECRAFT SHIELDING  
 ABLATIVE NOSE CONES  
 ABSORBERS (MATERIALS)  
 ARMOR

RT  
 ATTENUATION  
 ATTENUATORS  
 BAFFLES  
 % BARRIERS  
 BLAST DEFLECTORS  
 BLINDS  
 DEFLECTORS  
 DIVERTERS  
 ENCLOSURES  
 FLAME DEFLECTORS  
 GUARDS (SHIELDS)  
 HOUSINGS  
 LININGS  
 LOUVERS  
 MANIPULATORS  
 PANELS  
 PROTECTION  
 PROTECTORS  
 SAFETY DEVICES  
 % SCREENS  
 SHADES  
 SUPPRESSORS  
 WINDOWS (APERTURES)  
 WINDSHIELDS

SHIELDS (GEOLOGY)  
 USE BEDROCK

% SHIFT  
 0802 1201 3407  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                 |                                                                                                  |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                                                                                              | LISTED BELOW)<br>EXCHANGING<br>FREQUENCY SHIFT<br>PHASE SHIFT<br>SHIFT REGISTERS<br>TRANSFERRING | 0702<br>GS                                                                                                                                                             | TELECOMMUNICATION<br>.COMMUNICATION<br>.#SHIP TO SHORE COMMUNICATION<br>DATA TRANSMISSION<br>RADIO COMMUNICATION<br>SHIPS<br>TELEMETRY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CONSTRUCTION<br>ENCLOSURES<br>INDUSTRIAL AREAS<br>INDUSTRIES<br>LOGISTICS<br>MAINTENANCE<br>OCEANOGRAPHY<br>% PORTS<br>SHIPS<br>TANKER SHIPS<br>WATER VEHICLES                                                           |
| SHIFT REGISTERS<br>0801 0905 1002 1003 1201<br>RT COMPUTER COMPONENTS<br>COMPUTER STORAGE DEVICES<br>DELAY LINES (COMPUTER STORAGE)<br>DIGITAL TECHNIQUES<br>REGISTERS (COMPUTERS)<br>% SHIFT                                   |                                                                                                  | SHIPS<br>1104<br>GS                                                                                                                                                    | 1204 3401<br>WATER VEHICLES<br>#SHIPS<br>..ADVANCED RANGE INSTRUMENTATION<br>SHIP<br>..AIRCRAFT CARRIERS<br>..CARGO SHIPS<br>..SAVANNAH NUCLEAR SHIP<br>..TANKER SHIPS<br>..NUCLEAR POWERED SHIPS<br>..SAVANNAH NUCLEAR SHIP<br>..SATELLITE COMMUNICATIONS SHIPS<br>..SUBMARINES<br>..BALLISTIC MISSILE SUBMARINES<br>..GUIDED MISSILE SUBMARINES<br>..TRIDENT SUBMARINE<br>..SURFACE EFFECT SHIPS<br>..SWATH (SHIP)<br>AMPHIBIOUS VEHICLES<br>ANTISHIP MISSILES<br>ANTISHIP WARFARE<br>BOATS<br>HARBORS<br>HYDROFOIL CRAFT<br>HYDROFOILS<br>KEELS<br>MARINE TRANSPORTATION<br>% MILITARY VEHICLES<br>NAVY<br>OCEAN DATA ACQUISITIONS SYSTEMS<br>PROPELLERS<br>RESEARCH VEHICLES<br>SHIP HULLS<br>SHIP TO SHORE COMMUNICATION<br>SHIPYARDS<br>SURFACE NAVIGATION<br>SURFACE VEHICLES<br>% TRANSPORT VEHICLES<br>TRANSPORTATION ENERGY<br>UNDERWATER VEHICLES<br>% VESSELS | SHIVA LASER SYSTEM<br>1601<br>GS<br>STIMULATED EMISSION DEVICES<br>.LASERS<br>..HIGH POWER LASERS<br>..#SHIVA LASER SYSTEM<br>RT COHERENT LIGHT<br>LASER FUSION<br>LASER OUTPUTS<br>NOVA LASER SYSTEM<br>% SYSTEMS       |
| SHIFTING EQUILIBRIUM FLOW<br>1202 1203<br>GS FLUID FLOW<br>.GAS FLOW<br>..EQUILIBRIUM FLOW<br>..#SHIFTING EQUILIBRIUM FLOW<br>RT FROZEN EQUILIBRIUM FLOW                                                                        |                                                                                                  | RT                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SHIVERING<br>0405 0408<br>GS #SHIVERING<br>.DITHERS<br>RT BODY TEMPERATURE                                                                                                                                               |
| SHILLELAGH MISSILES<br>3101 3401<br>GS MISSILES<br>.SURFACE TO SURFACE MISSILES<br>..ANTITANK MISSILES<br>..#SHILLELAGH MISSILES                                                                                                |                                                                                                  | SHIP HULLS<br>1202 1204 3202 3401<br>GS HULLS (STRUCTURES)<br>#SHIP HULLS<br>RT HYDRODYNAMIC COEFFICIENTS<br>HYDRODYNAMICS<br>SHIPS<br>STRUCTURAL DESIGN<br>SUBMARINES |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SHOALS<br>1305<br>GS<br>#SHOALS<br>RT BEACHES<br>LAKES<br>OCEANOGRAPHY<br>OCEANS<br>REEFS<br>RIVERS<br>SEAS<br>WATER DEPTH                                                                                               |
| SHIP TERMINALS<br>1102 1305 3404 1310<br>GS TERMINAL FACILITIES<br>#SHIP TERMINALS<br>RT ARTIFICIAL HARBORS<br>DEEPWATER TERMINALS<br>HARBORS<br>MAROTS (ESA)<br>OFFSHORE DOCKING<br>TANKER TERMINALS<br>% TERMINALS<br>WHARVES |                                                                                                  | SHIPYARDS<br>3404<br>RT                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | % SHOCK<br>3203 3303 3304 3501<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT CONVULSIONS<br>MECHANICAL SHOCK<br>SHOCK (PHYSIOLOGY)<br>SHOCK RESISTANCE<br>THERMAL SHOCK |
| SHIP TO SHORE COMMUNICATION                                                                                                                                                                                                     |                                                                                                  |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SHOCK (PHYSIOLOGY)                                                                                                                                                                                                       |

|      |    |                               |    |                                   |                          |                                |
|------|----|-------------------------------|----|-----------------------------------|--------------------------|--------------------------------|
| O403 | RT | HUMAN REACTIONS               | RT | MAGNETOHYDRODYNAMIC SHEAR HEATING | 1107                     | 1202 3201 3501                 |
|      |    | HUMAN TOLERANCES              | GS | PLASMA HEATING                    | GS                       | SIMULATORS                     |
|      |    | PHYSIOLOGICAL EFFECTS         |    |                                   |                          | #SHOCK SIMULATORS              |
|      |    | PHYSIOLOGY                    |    |                                   | RT                       | VERTICAL MOTION SIMULATORS     |
|      |    | % SHOCK                       |    |                                   |                          | VIBRATION SIMULATORS           |
|      |    |                               |    |                                   |                          |                                |
|      |    | SHOCK ABSORBERS               |    |                                   | SHOCK SPECTRA            |                                |
|      |    | O202 0203 1504 3201           |    |                                   | 1202 2308 3203           |                                |
|      |    | RT % ABSORBERS                |    |                                   | GS                       | SPECTRA                        |
|      |    | ABSORBERS (EQUIPMENT)         |    |                                   |                          | #SHOCK SPECTRA                 |
|      |    | CUSHIONS                      |    |                                   | RT                       | DYNAMIC STRUCTURAL ANALYSIS    |
|      |    | DAMPING                       |    |                                   |                          | MECHANICAL SHOCK               |
|      |    | ENERGY ABSORPTION             |    |                                   |                          | NOISE SPECTRA                  |
|      |    | HYDRAULIC EQUIPMENT           |    |                                   |                          | STROKING TESTS                 |
|      |    | IMPACT                        |    |                                   |                          | STRUCTURAL DESIGN              |
|      |    | IMPACT ACCELERATION           |    |                                   |                          | STRUCTURAL VIBRATION           |
|      |    | ISOLATORS                     |    |                                   |                          |                                |
|      |    | LANDING GEAR                  |    |                                   |                          |                                |
|      |    | MECHANICAL SHOCK              |    |                                   | SHOCK TESTS              |                                |
|      |    | PNEUMATIC EQUIPMENT           |    |                                   | 1108 1406 1504 3203 3501 |                                |
|      |    | SILENCERS                     |    |                                   | RT                       | DROP TESTS                     |
|      |    | SPRINGS (ELASTIC)             |    |                                   |                          | IMPACT TESTS                   |
|      |    | SUSPENSION SYSTEMS (VEHICLES) |    |                                   |                          | LOAD TESTS                     |
|      |    | VIBRATION DAMPING             |    |                                   |                          | RAILROAD HUMPING TESTS         |
|      |    | VIBRATION ISOLATORS           |    |                                   | % TESTS                  |                                |
|      |    |                               |    |                                   |                          | VIBRATION TESTS                |
|      |    |                               |    |                                   |                          |                                |
|      |    | SHOCK DIFFUSERS               |    |                                   | SHOCK TUBES              |                                |
|      |    | USE                           |    |                                   | 1108 1201 1203 3501      |                                |
|      |    | SHOCK WAVE ATTENUATION        |    |                                   | GS                       | SHOCK WAVE GENERATORS          |
|      |    |                               |    |                                   |                          | #SHOCK TUBES                   |
|      |    |                               |    |                                   |                          | ..MAGNETIC ANNULAR SHOCK TUBES |
|      |    | SHOCK DISCONTINUITY           |    |                                   |                          | ..SHOCK TUBES                  |
|      |    | 1202 1203 3203                |    |                                   | RT                       | GAS TEMPERATURE                |
|      |    | GS                            |    |                                   |                          | HOTSHOT WIND TUNNELS           |
|      |    | DISCONTINUITY                 |    |                                   |                          | HYPERSONIC FLOW                |
|      |    | #SHOCK DISCONTINUITY          |    |                                   |                          | HYPERSONIC WIND TUNNELS        |
|      |    | RT                            |    |                                   |                          | HYPERVELOCITY WIND TUNNELS     |
|      |    | DENSITY DISTRIBUTION          |    |                                   |                          | LOW DENSITY RESEARCH           |
|      |    | WAVE FRONTS                   |    |                                   |                          | LOW DENSITY WIND TUNNELS       |
|      |    |                               |    |                                   |                          | MAGNETIC PISTONS               |
|      |    |                               |    |                                   |                          | TEST FACILITIES                |
|      |    |                               |    |                                   |                          | TUBE LASERS                    |
|      |    |                               |    |                                   | % TUBES                  |                                |
|      |    |                               |    |                                   |                          |                                |
|      |    | SHOCK FRONTS                  |    |                                   | SHOCK TUNNELS            |                                |
|      |    | 1202 1203                     |    |                                   | O201 1110 1203 3501      |                                |
|      |    | GS                            |    |                                   | GS                       | SHOCK WAVE GENERATORS          |
|      |    | WAVE FRONTS                   |    |                                   |                          | .SHOCK TUBES                   |
|      |    | #SHOCK FRONTS                 |    |                                   |                          | .SHOCK TUNNELS                 |
|      |    | RT                            |    |                                   |                          | TEST FACILITIES                |
|      |    | FRONTS                        |    |                                   |                          | .WIND TUNNELS                  |
|      |    | MAGNETOSHEATH                 |    |                                   |                          | ..HYPERSONIC WIND TUNNELS      |
|      |    | WAVE PROPAGATION              |    |                                   |                          | ..SHOCK TUNNELS                |
|      |    | WAVE SCATTERING               |    |                                   |                          | ..HYPERVELOCITY WIND TUNNELS   |
|      |    |                               |    |                                   |                          |                                |
|      |    | SHOCK HEATING                 |    |                                   |                          |                                |
|      |    | O602 0603 2502 3303 3501      |    |                                   |                          |                                |
|      |    | GS                            |    |                                   |                          |                                |
|      |    | HEATING                       |    |                                   |                          |                                |
|      |    | .KINETIC HEATING              |    |                                   |                          |                                |
|      |    | ..AERODYNAMIC HEATING         |    |                                   |                          |                                |
|      |    | ..SHOCK HEATING               |    |                                   |                          |                                |
|      |    | .TRANSIENT HEATING            |    |                                   |                          |                                |
|      |    | ..SHOCK HEATING               |    |                                   |                          |                                |

# NASA THESAURUS HIERARCHICAL UPDATE

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RT      ..#SHOCK TUNNELS
        CASCADE WIND TUNNELS
        HOTSHOT WIND TUNNELS
        HYPERSONIC FLOW
        LOW DENSITY RESEARCH
        LOW DENSITY WIND TUNNELS
        SUPERSONIC WIND TUNNELS

SHOCK WAVE ATTENUATION
1202 1203 3201 3203
UF      SHOCK DIFFUSERS
GS      ATTENUATION
        .WAVE ATTENUATION
        ..ACOUSTIC ATTENUATION
        ..#SHOCK WAVE ATTENUATION
RT      ATMOSPHERIC ATTENUATION
        NOISE REDUCTION
        WAVE PROPAGATION

SHOCK WAVE CONTROL
1202 1203 3201 3203 3404
RT      % CONTROL
        SECONDARY INJECTION
        SHEAR LAYERS

SHOCK WAVE GENERATORS
1202 1203 2501
GS      #SHOCK WAVE GENERATORS
        .SHOCK TUBES
        ..MAGNETIC ANNULAR SHOCK TUBES
        ..SHOCK TUNNELS
RT      % GENERATORS
        MAGNETIC PISTONS
        PRESSURE SENSORS
        PULSE GENERATORS
        WAVE GENERATION

SHOCK WAVE INTERACTION
1202 1203 3203
GS      WAVE INTERACTION
        #SHOCK WAVE INTERACTION
RT      % INTERACTIONS
        PROPAGATION MODES
        SCATTERING
        WAVE DEGRADATION

SHOCK WAVE LUMINESCENCE
0605 1202 1203 3203
GS      EMISSION
        .LIGHT EMISSION
        ..LUMINESCENCE
        ..#SHOCK WAVE LUMINESCENCE
RT      LOW DENSITY RESEARCH
        WAVE INTERACTION

SHOCK WAVE PROFILES
1202 1203 1413 3202 3203
RT      KROOK EQUATION
        PRESSURE DISTRIBUTION
        % PROFILES
        VELOCITY DISTRIBUTION
        WAVE INTERACTION

SHOCK WAVE PROPAGATION
1202 1203 3203
GS      TRANSMISSION
        .WAVE PROPAGATION
        .#SHOCK WAVE PROPAGATION
RT      ATMOSPHERIC ATTENUATION
        BURGER EQUATION
        CROCCO METHOD
        HIGH TEMPERATURE GASES
        NONEQUILIBRIUM RADIATION
        RANKINE-HUGONIOT RELATION
        SECONDARY INJECTION
        SOUND PROPAGATION
        TWO FLUID MODELS
        WAVE ATTENUATION
        WAVE INTERACTION

SHOCK WAVES
0101 0203 1202
UF      BOW SHOCK WAVES
GS      ELASTIC WAVES
        #SHOCK WAVES
        ..DETONATION WAVES
        ..MACH CONES
        ..NORMAL SHOCK WAVES
        ..OBLIQUE SHOCK WAVES
        ..RIEMANN WAVES
        ..SONIC BOOMS
        ADIABATIC EQUATIONS
        AERODYNAMIC NOISE
        BLAST LOADS
        % BLASTS
        BOW WAVES
        CAUSTIC LINES
        CRUSTAL FRACTURES
        DETONATION
        EARTHQUAKE DAMAGE
        EARTHQUAKE RESISTANCE
        EARTHQUAKE RESISTANT STRUCTURES
        EARTHQUAKES
        ELECTROSTATIC WAVES
        EXPLODING WIRES
        EXPLOSIONS
        GAS TEMPERATURE
        GEODYNAMICS
        HUGONIOT EQUATION OF STATE
        HYPERSONIC FLOW

SHOES
OS08
GS      CLOTHING
        #SHOES
RT      BOOTS (FOOTWEAR)
        LEATHER
        PROTECTIVE CLOTHING
        SOCKS

SHOOTING STAR AIRCRAFT
USE      T-33 AIRCRAFT

SHOPS
1507 3406
RT      MAINTENANCE

SHORAN
1904 2102 2103
UF      SHORT RANGE NAVIGATION
GS      NAVIGATION
        .RADIO NAVIGATION
        ..HYPERBOLIC NAVIGATION
        ..#SHORAN
RT      AIR NAVIGATION

```

DECCA NAVIGATION  
DISTANCE MEASURING EQUIPMENT  
NAVIGATION AIDS  
SOLAR COMPASSES

SHORT HAUL AIRCRAFT  
O201 3404  
GS

..DHC 4 AIRCRAFT  
..DHC 5 AIRCRAFT  
..QUESTOL AIRCRAFT  
..U-10 AIRCRAFT

RT % AIRCRAFT  
CIRCULATION CONTROL AIRFOILS

## SHORELINES

1305 1306

RT BEACHES

COASTAL WATER

COASTS

LAKES

OCEANOGRAPHY

OCEANS

RIVERS

SHALLOW WATER

TIDAL FLATS

WETLANDS

SHORT BELFAST C MK-1 AIRCRAFT  
USE SC-5 AIRCRAFT

SHORT RANGE BALLISTIC MISSILES  
3006 3101 3401  
GS

SHORT CIRCUIT CURRENTS

O906

GS ELECTRIC CURRENT

#SHORT CIRCUIT CURRENTS

RT OPEN CIRCUIT VOLTAGE

PHOTOVOLTAIC CELLS

SHORT CIRCUITS

SOLAR CELLS

VOLT-AMPERE CHARACTERISTICS

SHORT CIRCUITS

O902 1001 1002 1505

GS ELECTRICAL FAULTS

#SHORT CIRCUITS

RT CIRCUITS

ELECTRIC ARCS

FAILURE

JUMPERS

SHORT CIRCUIT CURRENTS

SNEAK CIRCUIT ANALYSIS

SYSTEM FAILURES

SHORT CRACKS

1704 2601

GS FRACTURES (MATERIALS)

.CRACKS

.#SHORT CRACKS

CRACK GEOMETRY

CRACK INITIATION

CRACK PROPAGATION

FATIGUE LIFE

FRACTURE MECHANICS

METAL FATIGUE

SHORT TAKEOFF AIRCRAFT

O201 0204 0207

UF STOL AIRCRAFT

GS

#SHORT TAKEOFF AIRCRAFT

..ALADIN 2 AIRCRAFT

..BREGUET 940 AIRCRAFT

..BREGUET 941 AIRCRAFT

..C-8A AUGMENTOR WING AIRCRAFT

..C-15 AIRCRAFT

..C-123 AIRCRAFT

SHORT WAVE RADIO TRANSMISSION

O703 0710 2402

GS TRANSMISSION

.ELECTROMAGNETIC WAVE TRANSMISSION

..RADIO TRANSMISSION

..#SHORT WAVE RADIO TRANSMISSION

..SIGNAL TRANSMISSION

..RADIO TRANSMISSION

..#SHORT WAVE RADIO TRANSMISSION

HIGH FREQUENCIES

WAVE PROPAGATION



# NASA THESAURUS HIERARCHICAL UPDATE

SHORTENING  
USE REDUCTION

% SHOT 3102 3106 3409  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT AMMUNITION  
LAUNCHING  
ORBITAL SHOTS  
PELLETS  
SHOT NOISE  
SHOT PEENING

SHOT NOISE  
0704 0705  
GS ELECTROMAGNETIC INTERFERENCE  
.RADIO FREQUENCY INTERFERENCE  
..ELECTROMAGNETIC NOISE  
..#SHOT NOISE  
RT BARRITT DIODES  
% SHOT  
THERMAL NOISE

SHOT PEENING  
1504 1704 3203  
GS HARDENING (MATERIALS)  
#SHOT PEENING  
METAL FINISHING  
.PEENING  
.#SHOT PEENING  
RT COLD WORKING  
DESCALING  
FATIGUE (MATERIALS)  
METAL WORKING  
% SHOT  
STRAIN HARDENING  
SURFACE FINISHING  
WORK HARDENING

SHOULDERS  
0404 0405  
RT JOINTS (ANATOMY)  
SCAPULA

% SHOWERS  
1308 2003 2901  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT COSMIC RAY SHOWERS  
FLOOD PREDICTIONS  
METEOROID SHOWERS

RAIN  
RAIN FORESTS  
RAINSTORMS

SHRAPNEL  
1704 3302 3401  
RT FRAGMENTATION  
FRAGMENTS  
PROJECTILES  
WEAPONS

SHREDDING  
1504 3407  
GS COMMUNITION  
#SHREDDING  
RT COMPOSTING  
CUTTING  
TEARING

SHRIKE MISSILE  
3101 3401  
GS MISSILES  
.AIR TO SURFACE MISSILES  
.#SHRIKE MISSILE  
RT SOLID PROPELLANT ROCKET ENGINES

SHRINKAGE  
1504 3203 3304  
RT CASTING  
CONTRACTION  
GROWTH  
% REDUCTION  
SINTERING  
TEMPERATURE INVERSIONS  
WARPAGE

SHROUDED BODIES  
USE SHROUDS

SHROUDED NOZZLES  
1201 1504 2806 2808 3501  
RT ANNULAR NOZZLES  
NOZZLE GEOMETRY  
NOZZLE WALLS  
% NOZZLES

SHROUDED PROPELLERS  
0104 2802  
UF DUCTED PROPELLERS  
GS PROPELLERS  
#SHROUDED PROPELLERS  
RT DUCTED FANS  
RING WINGS  
THRUST AUGMENTATION  
XV-11A AIRCRAFT

SHROUDED TURBINES  
0104 0303 1504  
GS TURBOMACHINERY  
.TURBINES  
.#SHROUDED TURBINES

SHROUDS  
1103  
UF SHROUDED BODIES  
RT COVERINGS  
DUCTED BODIES  
RIGGING

SHUNTS  
USE BYPASSES  
CIRCUITS

SHUTDOWNS  
0201 2801  
RT DEACTIVATION  
ENGINES  
% SCRAM

% SHUTTERS  
1407 1412  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT BLINDS  
CAMERA SHUTTERS  
LOUVERS  
SHADES

SHUTTLE AVIONICS INTEGRATION LABORATORY  
USE SAIL PROJECT

SHUTTLE BOOSTERS  
USE SPACE SHUTTLE BOOSTERS

SHUTTLE DERIVED VEHICLES  
3104 0205  
UF SDV  
RT ADVANCED LAUNCH SYSTEM (STS)  
MANNED SPACECRAFT  
SPACE SHUTTLE ORBITERS  
SPACE SHUTTLES  
% SPACECRAFT  
SPACECRAFT DESIGN

SHUTTLE ENGINEERING SIMULATOR  
0502  
UF SES (SHUTTLE)  
GS SIMULATORS  
#SHUTTLE ENGINEERING SIMULATOR

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                              |                                |  |  |  |  |
|------------------------------|--------------------------------|--|--|--|--|
| SIDES                        |                                |  |  |  |  |
| 1902                         | 3203                           |  |  |  |  |
| RT                           | EDGES                          |  |  |  |  |
|                              | GEOMETRY                       |  |  |  |  |
|                              | RIMS                           |  |  |  |  |
|                              | WALLS                          |  |  |  |  |
| SIDESLIP                     |                                |  |  |  |  |
| 0101                         | 0102                           |  |  |  |  |
| GS                           | MANEUVERS                      |  |  |  |  |
|                              | #SIDESLIP                      |  |  |  |  |
| RT                           | ROLL                           |  |  |  |  |
|                              | SKIDDING                       |  |  |  |  |
| %                            | SLIP                           |  |  |  |  |
|                              | SPACECRAFT MOTION              |  |  |  |  |
|                              | YAW                            |  |  |  |  |
| SIDEWASH                     |                                |  |  |  |  |
| USE                          | BACKWASH                       |  |  |  |  |
| SIDEWINDER MISSILES          |                                |  |  |  |  |
| 3101                         | 3401                           |  |  |  |  |
| GS                           | MISSILES                       |  |  |  |  |
|                              | .AIR TO AIR MISSILES           |  |  |  |  |
|                              | .#SIDEWINDER MISSILES          |  |  |  |  |
|                              | .ANTI-AIRCRAFT MISSILES        |  |  |  |  |
|                              | .#SIDEWINDER MISSILES          |  |  |  |  |
| SIEBEL AIRCRAFT              |                                |  |  |  |  |
| 0201                         | 0204                           |  |  |  |  |
| RT %                         | AIRCRAFT                       |  |  |  |  |
|                              | SHORT TAKEOFF AIRCRAFT         |  |  |  |  |
| SIEMENS 2002 COMPUTER        |                                |  |  |  |  |
| 0801                         |                                |  |  |  |  |
| GS                           | DATA PROCESSING EQUIPMENT      |  |  |  |  |
|                              | .COMPUTERS                     |  |  |  |  |
|                              | .#SIEMENS 2002 COMPUTER        |  |  |  |  |
| SIERRA LEONE                 |                                |  |  |  |  |
| 1305                         |                                |  |  |  |  |
| GS                           | NATIONS                        |  |  |  |  |
|                              | #SIERRA LEONE                  |  |  |  |  |
| RT                           | AFRICA                         |  |  |  |  |
| SIERRA NEVADA MOUNTAINS (CA) |                                |  |  |  |  |
| 1305                         |                                |  |  |  |  |
| GS                           | LANDFORMS                      |  |  |  |  |
|                              | .MOUNTAINS                     |  |  |  |  |
|                              | .#SIERRA NEVADA MOUNTAINS (CA) |  |  |  |  |
| RT                           | CALIFORNIA                     |  |  |  |  |
| SIEVES                       |                                |  |  |  |  |
| 0602                         | 2303 2404                      |  |  |  |  |
| GS                           |                                |  |  |  |  |
| SEPARATORS                   |                                |  |  |  |  |
| #SIEVES                      |                                |  |  |  |  |
| FLUID FILTERS                |                                |  |  |  |  |
| SHAKERS                      |                                |  |  |  |  |
| SIZING SCREENS               |                                |  |  |  |  |
| WIRE CLOTH                   |                                |  |  |  |  |
| USE                          | VISUAL PERCEPTION              |  |  |  |  |
| SIGMA COMPUTERS              |                                |  |  |  |  |
| 0801                         |                                |  |  |  |  |
| GS                           | DATA PROCESSING EQUIPMENT      |  |  |  |  |
|                              | .COMPUTERS                     |  |  |  |  |
|                              | ..DIGITAL COMPUTERS            |  |  |  |  |
|                              | ..#SIGMA COMPUTERS             |  |  |  |  |
|                              | ....SIGMA 9 COMPUTER           |  |  |  |  |
| SIGMA ORIONIS                |                                |  |  |  |  |
| 3001                         | 3002                           |  |  |  |  |
| GS                           | CELESTIAL BODIES               |  |  |  |  |
|                              | .STARS                         |  |  |  |  |
|                              | ..DOUBLE STARS                 |  |  |  |  |
|                              | ...BINARY STARS                |  |  |  |  |
|                              | ...#SIGMA ORIONIS              |  |  |  |  |
|                              | ..EARLY STARS                  |  |  |  |  |
|                              | ...HOT STARS                   |  |  |  |  |
|                              | ....B STARS                    |  |  |  |  |
|                              | ....#SIGMA ORIONIS             |  |  |  |  |
|                              | ..PECULIAR STARS               |  |  |  |  |
|                              | ..#SIGMA ORIONIS               |  |  |  |  |
| ORION CONSTELLATION          |                                |  |  |  |  |
| STELLAR SYSTEMS              |                                |  |  |  |  |
| SIGMA 5 COMPUTER             |                                |  |  |  |  |
| 0801                         |                                |  |  |  |  |
| GS                           | DATA PROCESSING EQUIPMENT      |  |  |  |  |
|                              | .COMPUTERS                     |  |  |  |  |
|                              | ..ANALOG COMPUTERS             |  |  |  |  |
|                              | ..#SIGMA 5 COMPUTER            |  |  |  |  |
|                              | ..DIGITAL COMPUTERS            |  |  |  |  |
|                              | ..#SIGMA 5 COMPUTER            |  |  |  |  |
| SIGMA 7                      |                                |  |  |  |  |
| 3104                         | 3409                           |  |  |  |  |
| GS                           | MANNED SPACECRAFT              |  |  |  |  |
|                              | .MERCURY SPACECRAFT            |  |  |  |  |
|                              | .#SIGMA 7                      |  |  |  |  |
|                              | REENTRY VEHICLES               |  |  |  |  |
|                              | .RECOVERABLE SPACECRAFT        |  |  |  |  |
|                              | ..MERCURY SPACECRAFT           |  |  |  |  |
|                              | ..#SIGMA 7                     |  |  |  |  |
|                              | SOFT LANDING SPACECRAFT        |  |  |  |  |
|                              | .MERCURY SPACECRAFT            |  |  |  |  |
|                              | .#SIGMA 7                      |  |  |  |  |
| SPACE CAPSULES               |                                |  |  |  |  |
| .MERCURY SPACECRAFT          |                                |  |  |  |  |
| .#SIGMA 7                    |                                |  |  |  |  |
| MERCURY MA-8 FLIGHT          |                                |  |  |  |  |
| RT                           |                                |  |  |  |  |
| SIGMA 9 COMPUTER             |                                |  |  |  |  |
| 0801                         |                                |  |  |  |  |
| GS                           | DATA PROCESSING EQUIPMENT      |  |  |  |  |
|                              | .COMPUTERS                     |  |  |  |  |
|                              | ..DIGITAL COMPUTERS            |  |  |  |  |
|                              | ...SIGMA COMPUTERS             |  |  |  |  |
|                              | ...#SIGMA 9 COMPUTER           |  |  |  |  |
| SIGMA-MESONS                 |                                |  |  |  |  |
| 2403                         | 2405                           |  |  |  |  |
| GS                           | PARTICLES                      |  |  |  |  |
|                              | .ELEMENTARY PARTICLES          |  |  |  |  |
|                              | ..BOSONS                       |  |  |  |  |
|                              | ...MESONS                      |  |  |  |  |
|                              | ....VECTOR MESONS              |  |  |  |  |
|                              | ....#SIGMA-MESONS              |  |  |  |  |
|                              | ..FERMIONS                     |  |  |  |  |
|                              | ...BARYONS                     |  |  |  |  |
|                              | ...#SIGMA-MESONS               |  |  |  |  |
|                              | ..HADRONS                      |  |  |  |  |
|                              | ...BARYONS                     |  |  |  |  |
|                              | ...#SIGMA-MESONS               |  |  |  |  |
|                              | ...MESONS                      |  |  |  |  |
|                              | ....VECTOR MESONS              |  |  |  |  |
|                              | ....#SIGMA-MESONS              |  |  |  |  |
|                              | .NUCLEAR PARTICLES             |  |  |  |  |
|                              | ..BOSONS                       |  |  |  |  |
|                              | ...MESONS                      |  |  |  |  |
|                              | ....VECTOR MESONS              |  |  |  |  |
|                              | ....#SIGMA-MESONS              |  |  |  |  |
|                              | CHARGED PARTICLES              |  |  |  |  |
| ETA-MESONS                   |                                |  |  |  |  |
| SIGNAL ANALYSIS              |                                |  |  |  |  |
| 0702                         | 0705 0708 0803 1409            |  |  |  |  |
| GS                           | DATA PROCESSING                |  |  |  |  |
|                              | #SIGNAL ANALYSIS               |  |  |  |  |
|                              | ..CEPSTRAL ANALYSIS            |  |  |  |  |
|                              | ..ANALYZING                    |  |  |  |  |
| DIGITAL RADAR SYSTEMS        |                                |  |  |  |  |
| FREQUENCY ANALYZERS          |                                |  |  |  |  |
| PHASE DEVIATION              |                                |  |  |  |  |
| SIGNAL MEASUREMENT           |                                |  |  |  |  |
| SPECTRUM ANALYSIS            |                                |  |  |  |  |
| WAVELET ANALYSIS             |                                |  |  |  |  |
| SIGNAL ANALYZERS             |                                |  |  |  |  |
| 0701                         | 0705 0905                      |  |  |  |  |
| GS                           | MEASURING INSTRUMENTS          |  |  |  |  |
|                              | .ANALYZERS                     |  |  |  |  |

```

RT      #SIGNAL ANALYZERS
ANALOG COMPUTERS
AUTODYNES

SIGNAL DETECTION
0701    0702 0703 0705 0710 0905
GS      DETECTION
#SIGNAL DETECTION
..CORRELATION DETECTION
RT      AUTODYNES
% DETECTORS
DISCRIMINATION
DYNAMIC RANGE
PHASE DETECTORS
PREAMPLIFIERS
RADAR DETECTION
SIGNAL MEASUREMENT
SOUND TRANSDUCERS
TELECOMMUNICATION

SIGNAL DETECTORS
0702    SIGNAL DISCRIMINATORS
UF      AUTODYNES
RT      DETECTORS
% DETECTORS
DISCRIMINATION
MICROWAVE SENSORS
PREAMPLIFIERS
SIGNAL MEASUREMENT
SOUND TRANSDUCERS
TELECOMMUNICATION

SIGNAL DISCRIMINATORS
USE      SIGNAL DETECTORS

SIGNAL DISTORTION
0702    0705 0710
GS      DISTORTION
#SIGNAL DISTORTION
RT      INTERSYMBOLIC INTERFERENCE
RADIO SIGNALS
SCRAMBLING (COMMUNICATION)

SIGNAL ENCODING
0702    0703 0705 0802
GS      CODING
#SIGNAL ENCODING
..AMPLITUDE MODULATION
...QUADRATURE AMPLITUDE MODULATION
...FREQUENCY MODULATION
...FEEDBACK FREQUENCY MODULATION
...FM/PM (MODULATION)
...FREQUENCY SHIFT KEYING
...PULSE FREQUENCY MODULATION
..PHASE MODULATION

...FM/PM (MODULATION)
...PHASE SHIFT KEYING
...BINARY PHASE SHIFT KEYING
...QUADRATURE PHASE SHIFT KEYING
...PULSE MODULATION
...PULSE AMPLITUDE MODULATION
...PULSE CODE MODULATION
...DELTA MODULATION
...DIFFERENTIAL PULSE CODE
MODULATION
...PULSE FREQUENCY MODULATION
...PULSE TIME MODULATION
...PULSE DURATION MODULATION
...PULSE POSITION MODULATION
...TRELLIS CODING
CONCATENATED CODES
DIGITAL TO ANALOG CONVERTERS
PULSE FREQUENCY MODULATION
TELEMETRY
REDUNDANCY ENCODING
REED-SOLOMON CODES
SCRAMBLING (COMMUNICATION)
TELECOMMUNICATION
TRANSMITTERS
VITERBI DECODERS
VOICE DATA PROCESSING
WAVELET ANALYSIS

RT      SIGNAL MEASUREMENT
SIGNAL MEASUREMENT
0701    0705 0905
GS      #SIGNAL GENERATORS
.FREQUENCY SYNTHESIZERS
.FUNCTION GENERATORS
RT      CIRCUITS
% GENERATORS
HALL GENERATORS
OSCILLATORS
SIRENS
SOLID STATE DEVICES
SOUND GENERATORS
SUBHARMONIC GENERATORS
VOLTAGE GENERATORS

SIGNAL MEASUREMENT
0702    0705 0708 0710 1406
UF      ELECTRONIC SIGNAL MEASUREMENT
RT      ELECTROMAGNETIC MEASUREMENT
% MEASUREMENT
SIGNAL ANALYSIS
SIGNAL DETECTION
SIGNAL DETECTORS
SIGNAL FADING
SIGNAL PROCESSING
SIGNAL TO NOISE RATIOS

SIGNAL MIXING
0702    0703 0705 0710
GS      MIXING
RT      #SIGNAL MIXING
AUDITORY SIGNALS
ERROR SIGNALS
FOUR-WAVE MIXING
MAGNETIC SIGNALS
RADIO SIGNALS

SIGNAL PROCESSING
0702    0703 0708 1905
GS      DATA PROCESSING
RT      #SIGNAL PROCESSING
AUDIO SIGNALS

```

|                             |  |
|-----------------------------|--|
| COMPANDING                  |  |
| DIRECTION FINDING           |  |
| EQUALIZERS (CIRCUITS)       |  |
| INTERFERENCE IMMUNITY       |  |
| MAXIMUM ENTROPY METHOD      |  |
| MESSAGE PROCESSING          |  |
| ONBOARD DATA PROCESSING     |  |
| % PROCESSING                |  |
| SIGNAL MEASUREMENT          |  |
| SMOKE DETECTORS             |  |
| SURFACE ACOUSTIC WAVE D     |  |
| TELEMETRY                   |  |
| VHSC (CIRCUITS)             |  |
| VIDEO SIGNALS               |  |
| VITERBI DECODERS            |  |
| WAVELET ANALYSIS            |  |
|                             |  |
| SIGNAL RECEPTION            |  |
| O702 O703 O705 O710         |  |
| GS #SIGNAL RECEPTION        |  |
| .SYLLABLES                  |  |
| .SYMBOLS                    |  |
| .TELEVISION RECEPTION       |  |
| RT HOMODYNE RECEPTION       |  |
| PREAMPLIFIERS               |  |
| % RECEIVING                 |  |
| SENTENCES                   |  |
| TRANSMISSION RATE (COMMUN   |  |
| VOCODERS                    |  |
|                             |  |
| SIGNAL REFLECTION           |  |
| O705 O710 1302 2309         |  |
| GS ECHOES                   |  |
| #SIGNAL REFLECTION          |  |
| REFLECTION                  |  |
| #SIGNAL REFLECTION          |  |
| RT CEPSTRAL ANALYSIS        |  |
| SPREAD REFLECTION           |  |
| TRANSMISSION                |  |
| WAVE REFLECTION             |  |
|                             |  |
| SIGNAL STABILIZATION        |  |
| O702 O705 O707 O709 2102    |  |
| GS STABILIZATION            |  |
| #SIGNAL STABILIZATION       |  |
| RT FREQUENCY CONTROL        |  |
| TRANSMISSION CIRCUITS       |  |
|                             |  |
| SIGNAL TO NOISE RATIOS      |  |
| O703 O704 O705              |  |
| GS RATIOS                   |  |
| #SIGNAL TO NOISE RATIOS     |  |
| RT AMPLITUDE DISTRIBUTION A |  |
| ATTENUATION                 |  |
| BACKGROUND NOISE            |  |

```

    ..TELEMETRY
    ...BIOTELEMETRY
    ...P.A.C.M. TELEMETRY
    ...PCM TELEMETRY
    ...RADIO TELEMETRY
    ....PULSE FREQUENCY MODULATION
        TELEMETRY
    ..TELEVISION TRANSMISSION
        AUDIO SIGNALS
        CODE DIVISION MULTIPLEXING
        MESSAGE PROCESSING
        MESSAGES
        MULTIPLEXING
        ORTHOGONAL MULTIPLEXING THEORY
        PACKET SWITCHING
        PULSE COMMUNICATION
        RADAR ATTENUATION
        RADIO ATTENUATION
        RADIO SCATTERING
        SENTENCES
        SOUND TRANSMISSION
        SYLLABLES
        TALKING
        TELECOMMUNICATION
        TRANSMISSION EFFICIENCY
        TRANSMISSION RATE (COMMUNICATIONS)
        VIDEO SIGNALS
        WIRELESS COMMUNICATION

```

SIGNALS  
0702 0703 1001 1002 2402  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT  
AUDIO SIGNALS  
AUDITORY SIGNALS  
BEACONS  
BELLS  
CHIRP SIGNALS  
ELECTRIC PULSES  
ERROR SIGNALS  
HORNS  
MAGNETIC SIGNALS  
MESSAGES  
PSEUDORANDOM SEQUENCES  
PYROTECHNICS  
RADIO SIGNALS  
RANDOM SIGNALS  
SIGNAL TO NOISE RATIOS  
SIRENS  
SOUND GENERATORS  
TELECOMMUNICATION  
TIME SIGNALS  
VISUAL SIGNALS

VISUAL STIMULI

SIGNATURE ANALYSIS

0705 0710 3401

RT % ANALYZING

CEPSTRAL ANALYSIS

DETECTION

IMAGERY

INFRARED SIGNATURES

MICROWAVE SIGNATURES

MISSILE SIGNATURES

RADAR SIGNATURES

SIGNATURES

TARGET RECOGNITION

SIGNATURES

0705 3401

GS #SIGNATURES

.INFRARED SIGNATURES

.MAGNETIC SIGNATURES

.MISSILE SIGNATURES

.RADAR SIGNATURES

.SPECTRAL SIGNATURES

..MICROWAVE SIGNATURES

AMPLITUDE DISTRIBUTION ANALYSIS

DETECTION

REPRESENTATIONS

SIGNATURE ANALYSIS

TARGET RECOGNITION

VIDEO LANDMARK ACQUISITION AND

TRACKING

SIGNIFICANCE

1905

RT

CONFIDENCE LIMITS

CORRELATION

COVARIANCE

DEGREES OF FREEDOM

FINITE DIFFERENCE THEORY

NULL HYPOTHESIS

NUMERICAL ANALYSIS

REGRESSION ANALYSIS

STATISTICAL TESTS

TELECONNECTIONS (METEOROLOGY)

SIGNS (SYMBOLS)

USE SYMBOLS

SIGNS AND SYMPTOMS

0405

UF SYMPTOMS

SYNDROMES

GS #SIGNS AND SYMPTOMS

.ACQUIRED IMMUNODEFICIENCY SYNDROME

.BRADYCARDIA

.COUGH

.DYSPNEA

.EDEMA

.HEADACHE

.HEMATURIA

.LEUKOPENIA

.NAUSEA

.VERTIGO

ASPHYXIA

DISEASES

HALLUCINATIONS

% INDICATION

SYMPTOMOLOGY

RT

SIKHOTE-ALIN METEORITE

3005

GS

CELESTIAL BODIES

.METEORITES

..IRON METEORITES

..#SIKHOTE-ALIN METEORITE

SIKKIM

1305

GS

NATIONS

#SIKKIM

ASIA

BHUTAN

HIMALAYAS

INDIA

SIKORSKY AIRCRAFT

0201 0204 0206 0207

GS #SIKORSKY AIRCRAFT

.CH-3 HELICOPTER

.CH-34 HELICOPTER

.CH-54 HELICOPTER

.H-19 HELICOPTER

.H-53 HELICOPTER

.H-56 HELICOPTER

.H-60 HELICOPTER

.S-61 HELICOPTER

.S-67 HELICOPTER

.SH-3 HELICOPTER

.SH-4 HELICOPTER

.SIKORSKY WHIRLWIND HELICOPTER

.UH-34 HELICOPTER

.UH-60A HELICOPTER

.UH-61A HELICOPTER

RT % AIRCRAFT

SIKORSKY HSS-2 HELICOPTER

USE SH-3 HELICOPTER

SIKORSKY S-58 HELICOPTER

USE S-58 HELICOPTER

SIKORSKY S-61 HELICOPTER

USE S-61 HELICOPTER

SIKORSKY S-64 HELICOPTER

USE CH-54 HELICOPTER

SIKORSKY S-65 HELICOPTER

USE H-53 HELICOPTER

SIKORSKY S-67 HELICOPTER

USE S-67 HELICOPTER

SIKORSKY WHIRLWIND HELICOPTER

0206

GS

SIKORSKY AIRCRAFT

#SIKORSKY WHIRLWIND HELICOPTER

V/STOL AIRCRAFT

.ROTARY WING AIRCRAFT

..HELICOPTERS

...MILITARY HELICOPTERS

...#SIKORSKY WHIRLWIND HELICOPTER

RT % AIRCRAFT

SILANES

0603 1804

GS

HYDROGEN COMPOUNDS

.HYDRIDES

..#SILANES

...CHLOROSILANES

...METHYL CHLOROSILANES

SILICON COMPOUNDS

#SILANES

..CHLOROSILANES

..METHYL CHLOROSILANES

DISILICIDES

POLYCARBOSILANES

POLYSILANES

RT

SILENCE

0703 2301

RT

NOISE REDUCTION

TRANSMISSION LOSS

SILENCERS

0701 0705 2301

RT

ATTENUATORS

DAMPING

INHIBITORS

MUFFLERS

SHOCK ABSORBERS

SQUELCH CIRCUITS

SUPPRESSORS

ZERO SOUND

# NASA THESAURUS HIERARCHICAL UPDATE

SILICA  
USE SILICON DIOXIDE

SILICA GEL  
0603  
GS

RT  
#SILICA GEL  
AEROGELS  
DEHUMIDIFICATION  
DEHYDRATION  
DRYING  
SILICON DIOXIDE

SILICA GLASS  
1801 1804 1805  
GS

RT  
#SILICA GLASS  
GLASS COATINGS  
GLASS ELECTRODES  
GLASS FIBERS  
GLASSWARE  
SANDS  
SILICON DIOXIDE

SILICATES  
0603 1801 1804 1805  
GS

#SILICON COMPOUNDS  
..ALUMINUM SILICATES  
...ANDESITE  
...GEHLENITE  
...KAOLINITE  
...MONTMORILLONITE  
...PYROPHYLLITE  
..ARAGONITE  
..BERYL  
..CALCIUM SILICATES  
...GEHLENITE  
...CORDIERITE  
..FAYALITE  
...FELDSPARS  
..FLUOROSILICATES  
..FORSTERITE  
..GARNETS  
...GADOLINIUM-GALLIUM GARNET  
...YTTRIUM-ALUMINUM GARNET  
...YTTRIUM-IRON GARNET  
..MERWINITE  
..MONTICELLITE  
..NEPHELINE  
..POTASSIUM SILICATES  
..PYROXENES  
...ENSTATITE  
...SODIUM SILICATES

...SPODUMENE  
...TALC

RT  
...TOURMALINE  
..ZEOLITES  
AKERMANITE  
AMPHIBOLES  
DISILICIDES  
MINERALS  
SILICIDES  
SILICON DIOXIDE  
TETRAETHYL ORTHOSILICATE  
VERMICULITE

SILICIDES

1801 1804 1805  
GS  
SILICON COMPOUNDS  
#SILICIDES  
..DISILICIDES  
RT  
INTERMETALLICS  
SILICATES

SILICON  
0603 1805 1807  
GS

CHEMICAL ELEMENTS  
..METALLOIDS  
..#SILICON  
...AMORPHOUS SILICON  
...SILICON ISOTOPES  
RT  
FLOAT ZONES  
REACTION BONDING  
SCHOTTKY DIODES  
SILICON ALLOYS

SILICON ALLOYS  
1701 1704 1805  
GS

RT  
#SILICON ALLOYS  
ALUMINUM ALLOYS  
GERMANIUM ALLOYS  
IRON ALLOYS  
MAGNESIUM ALLOYS  
MICROSTRUCTURE  
NICKEL ALLOYS  
SILICON

SILICON CARBIDES  
1805 2602  
GS

CARBON COMPOUNDS  
..CARBIDES  
..#SILICON CARBIDES  
SILICON COMPOUNDS  
#SILICON CARBIDES  
RT  
ABRASIVES  
CARBORUNDUM (TRADEMARK)  
CERAMIC FIBERS

POLYCARBOSILANES

SILICON COMPOUNDS

0603 1805  
GS #SILICON COMPOUNDS  
..FLINT  
..ORGANIC SILICON COMPOUNDS  
..TRIPHENYL SILICON  
..SILANES  
..CHLOROSILANES  
..METHYL CHLOROSILANES  
..SILICATES  
..ALUMINUM SILICATES  
...ANDESITE  
...GEHLENITE  
...KAOLINITE  
...MONTMORILLONITE  
...PYROPHYLLITE  
..ARAGONITE  
..BERYL  
..CALCIUM SILICATES  
...GEHLENITE  
...CORDIERITE  
..FAYALITE  
..FELDSPARS  
..FLUOROSILICATES  
..FORSTERITE  
..GARNETS  
...GADOLINIUM-GALLIUM GARNET  
...YTTRIUM-ALUMINUM GARNET  
...YTTRIUM-IRON GARNET  
..MERWINITE  
..MONTICELLITE  
..NEPHELINE  
..POTASSIUM SILICATES  
..PYROXENES  
...ENSTATITE  
..SODIUM SILICATES  
...SPODUMENE  
...TALC  
...TOURMALINE  
..ZEOLITES  
..SILICIDES  
..DISILICIDES  
..SILICON CARBIDES  
..SILICON NITRIDES  
..SILICON OXIDES  
..MUSCOVITE  
..NEPHELINE  
..SILICON DIOXIDE  
...QUARTZ  
...COESITE  
...STISHOVITE  
..SPODUMENE  
..SILICON TETRACHLORIDE

```

RT      AKERMANITE
%      % CHEMICAL COMPOUNDS
%      % GROUP 4A COMPOUNDS
%      METHYL POLYSILOXANES
%      POLYSILOXANES
%      SILICONES
%      SILOXANES

SILICON CONTROLLED RECTIFIERS
0902 0905 0906
UF    SCR (RECTIFIERS)
GS    ELECTRONIC EQUIPMENT
      .SOLID STATE DEVICES
      .SEMICONDUCTOR DEVICES
      ...THYRISTORS
      ...#SILICON CONTROLLED RECTIFIERS
      RECTIFIERS
      .THYRISTORS
      .#SILICON CONTROLLED RECTIFIERS
RT    CURRENT CONVERTERS (AC TO DC)
      THYRATRONS

SILICON DIOXIDE
0603 1801 1804
UF    REFRA SIL (TRADEMARK)
      SILICA
GS    CHALCOGENIDES
      .OXIDES
      ..DIOXIDES
      ..#SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
      ..SILICON OXIDES
      ..#SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
SILICON COMPOUNDS
.SILICON OXIDES
.#SILICON DIOXIDE
...QUARTZ
...COESITE
...STISHOVITE
BOROSILICATE GLASS
CERAMICS
E GLASS
GLASS
METALLIC GLASSES
OBSIDIAN
PORCELAIN
QUARTZ CRYSTALS
RHYOLITE
S GLASS
SANDS

SILICA GEL
SILICA GLASS
SILICATES
VYCOR

SILICON FILMS
1506 1802 1805 2602
RT    AMORPHOUS SILICON
      % FILMS
      SEMICONDUCTOR DEVICES
      SOI (SEMICONDUCTORS)
      THIN FILMS

SILICON ISOTOPES
0603 1805 1807
GS    CHEMICAL ELEMENTS
      .METALLOIDS
      ..SILICON
      ...#SILICON ISOTOPES

SILICON JUNCTIONS
0902 0906 2602
GS    SEMICONDUCTOR JUNCTIONS
      #SILICON JUNCTIONS
RT    AMORPHOUS SILICON
      HETEROJUNCTIONS
      HOMOJUNCTIONS
      SIS (SEMICONDUCTORS)
      SOI (SEMICONDUCTORS)
      THRESHOLD VOLTAGE

SILICON NITRIDES
0603 1804
GS    NITROGEN COMPOUNDS
      .NITRIDES
      .#SILICON NITRIDES
      SILICON COMPOUNDS
      #SILICON NITRIDES
RT    CERAMIC MATRIX COMPOSITES
      REACTION BONDING
      SIALON

SILICON OXIDES
1804 1805 2602
GS    CHALCOGENIDES
      .OXIDES
      .#SILICON OXIDES
      ...MUSCOVITE
      ...NEPHELINE
      ...SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
      ....SPODUMENE
      SILICON COMPOUNDS

RT      AKERMANITE
%      % CHEMICAL COMPOUNDS
%      % GROUP 4A COMPOUNDS
%      METHYL POLYSILOXANES
%      POLYSILOXANES
%      SILICONES
%      SILOXANES

SILICON CONTROLLED RECTIFIERS
0902 0905 0906
UF    SCR (RECTIFIERS)
GS    ELECTRONIC EQUIPMENT
      .SOLID STATE DEVICES
      .SEMICONDUCTOR DEVICES
      ...THYRISTORS
      ...#SILICON CONTROLLED RECTIFIERS
      RECTIFIERS
      .THYRISTORS
      .#SILICON CONTROLLED RECTIFIERS
RT    CURRENT CONVERTERS (AC TO DC)
      THYRATRONS

SILICON DIOXIDE
0603 1801 1804
UF    REFRA SIL (TRADEMARK)
      SILICA
GS    CHALCOGENIDES
      .OXIDES
      ..DIOXIDES
      ..#SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
      ..SILICON OXIDES
      ..#SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
BOROSILICATE GLASS
CERAMICS
E GLASS
GLASS
METALLIC GLASSES
OBSIDIAN
PORCELAIN
QUARTZ CRYSTALS
RHYOLITE
S GLASS
SANDS

SILICA GEL
SILICA GLASS
SILICATES
VYCOR

SILICON FILMS
1506 1802 1805 2602
RT    AMORPHOUS SILICON
      % FILMS
      SEMICONDUCTOR DEVICES
      SOI (SEMICONDUCTORS)
      THIN FILMS

SILICON ISOTOPES
0603 1805 1807
GS    CHEMICAL ELEMENTS
      .METALLOIDS
      ..SILICON
      ...#SILICON ISOTOPES

SILICON JUNCTIONS
0902 0906 2602
GS    SEMICONDUCTOR JUNCTIONS
      #SILICON JUNCTIONS
RT    AMORPHOUS SILICON
      HETEROJUNCTIONS
      HOMOJUNCTIONS
      SIS (SEMICONDUCTORS)
      SOI (SEMICONDUCTORS)
      THRESHOLD VOLTAGE

SILICON NITRIDES
0603 1804
GS    NITROGEN COMPOUNDS
      .NITRIDES
      .#SILICON NITRIDES
      SILICON COMPOUNDS
      #SILICON NITRIDES
RT    CERAMIC MATRIX COMPOSITES
      REACTION BONDING
      SIALON

SILICON OXIDES
1804 1805 2602
GS    CHALCOGENIDES
      .OXIDES
      .#SILICON OXIDES
      ...MUSCOVITE
      ...NEPHELINE
      ...SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
      ....SPODUMENE
      SILICON COMPOUNDS

RT      AKERMANITE
%      % CHEMICAL COMPOUNDS
%      % GROUP 4A COMPOUNDS
%      METHYL POLYSILOXANES
%      POLYSILOXANES
%      SILICONES
%      SILOXANES

SILICON CONTROLLED RECTIFIERS
0902 0905 0906
UF    SCR (RECTIFIERS)
GS    ELECTRONIC EQUIPMENT
      .SOLID STATE DEVICES
      .SEMICONDUCTOR DEVICES
      ...THYRISTORS
      ...#SILICON CONTROLLED RECTIFIERS
      RECTIFIERS
      .THYRISTORS
      .#SILICON CONTROLLED RECTIFIERS
RT    CURRENT CONVERTERS (AC TO DC)
      THYRATRONS

SILICON DIOXIDE
0603 1801 1804
UF    REFRA SIL (TRADEMARK)
      SILICA
GS    CHALCOGENIDES
      .OXIDES
      ..DIOXIDES
      ..#SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
      ..SILICON OXIDES
      ..#SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
BOROSILICATE GLASS
CERAMICS
E GLASS
GLASS
METALLIC GLASSES
OBSIDIAN
PORCELAIN
QUARTZ CRYSTALS
RHYOLITE
S GLASS
SANDS

SILICA GEL
SILICA GLASS
SILICATES
VYCOR

SILICON FILMS
1506 1802 1805 2602
RT    AMORPHOUS SILICON
      % FILMS
      SEMICONDUCTOR DEVICES
      SOI (SEMICONDUCTORS)
      THIN FILMS

SILICON ISOTOPES
0603 1805 1807
GS    CHEMICAL ELEMENTS
      .METALLOIDS
      ..SILICON
      ...#SILICON ISOTOPES

SILICON JUNCTIONS
0902 0906 2602
GS    SEMICONDUCTOR JUNCTIONS
      #SILICON JUNCTIONS
RT    AMORPHOUS SILICON
      HETEROJUNCTIONS
      HOMOJUNCTIONS
      SIS (SEMICONDUCTORS)
      SOI (SEMICONDUCTORS)
      THRESHOLD VOLTAGE

SILICON NITRIDES
0603 1804
GS    NITROGEN COMPOUNDS
      .NITRIDES
      .#SILICON NITRIDES
      SILICON COMPOUNDS
      #SILICON NITRIDES
RT    CERAMIC MATRIX COMPOSITES
      REACTION BONDING
      SIALON

SILICON OXIDES
1804 1805 2602
GS    CHALCOGENIDES
      .OXIDES
      .#SILICON OXIDES
      ...MUSCOVITE
      ...NEPHELINE
      ...SILICON DIOXIDE
      ....QUARTZ
      .....COESITE
      .....STISHOVITE
      ....SPODUMENE
      SILICON COMPOUNDS

SILICON TRANSISTORS
0905 0906 2602
GS    ELECTRONIC EQUIPMENT
      .SOLID STATE DEVICES
      .SEMICONDUCTOR DEVICES
      ...TRANSISTORS
      ...#SILICON TRANSISTORS
      ....SOS (SEMICONDUCTORS)
      RT    SOI (SEMICONDUCTORS)

SILICON RADIATION DETECTORS
0906 2403 2602
GS    MEASURING INSTRUMENTS
      .RADIATION MEASURING INSTRUMENTS
      .RADIATION DETECTORS
      ..#SILICON RADIATION DETECTORS
      RT % RADIATION

SILICON RECTIFIERS
USE    CRYSTAL RECTIFIERS

SILICON SOLAR CELLS
USE    SOLAR CELLS

SILICON TETRACHLORIDE
1804
GS    HALOGEN COMPOUNDS
      .CHLORINE COMPOUNDS
      ..CHLORIDES
      ..#SILICON TETRACHLORIDE
      .HALIDES
      ..CHLORIDES
      ..#SILICON TETRACHLORIDE
      SILICON COMPOUNDS
      #SILICON TETRACHLORIDE

SILICON TRANSISTORS
0905 0906 2602
GS    ELECTRONIC EQUIPMENT
      .SOLID STATE DEVICES
      .SEMICONDUCTOR DEVICES
      ...TRANSISTORS
      ...#SILICON TRANSISTORS
      ....SOS (SEMICONDUCTORS)
      RT    SOI (SEMICONDUCTORS)

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# NASA THESAURUS HIERARCHICAL UPDATE

SILICON-ON-INSULATOR SEMICONDUCTORS  
USE SOI (SEMICONDUCTORS)

SILICON-ON-SAPPHIRE JUNCTIONS  
USE SOS (SEMICONDUCTORS)

SILICON-ON-SAPPHIRE SEMICONDUCTORS  
USE SOS (SEMICONDUCTORS)

SILICON-ON-SAPPHIRE TRANSISTORS  
USE SOS (SEMICONDUCTORS)

SILICONE RESINS  
1802 1805 1808 1810  
GS RESINS

#SILICONE RESINS  
SILICON POLYMERS  
#SILICONE RESINS

RT THERMOSETTING RESINS

SILICONE RUBBER  
1802 1805 1808 1809 1810  
GS RUBBER

#SILICONE RUBBER  
..RTV-40 RUBBER (TRADEMARK)  
..RTV-60 RUBBER (TRADEMARK)  
RT ELASTOMERS  
SYNTHETIC RUBBERS

SILICONES  
1805 1808 1810  
GS SILICON POLYMERS  
#SILICONES  
..METHYL POLYSILOXANES  
..SILOXANES  
RT % POLYMERS  
SILICON COMPOUNDS

SILICONIZING  
0602 1702 1704 3404  
GS HARDENING (MATERIALS)  
#SILICONIZING  
RT COATING  
COATINGS  
CORROSION PREVENTION  
CORROSION RESISTANCE  
OXIDATION RESISTANCE  
PASSIVITY

SILK  
1811  
GS FABRICS  
#SILK  
FIBERS

#SILK  
CREPE  
ORGANIC MATERIALS

SILKWORMS  
0402  
GS ANIMALS  
..INVERTEBRATES  
..ARTHROPODS  
...INSECTS  
....MOTHS  
....#SILKWORMS  
LARVAE  
#SILKWORMS  
RT INFESTATION

SILOS (MISSILE STORAGE)  
USE MISSILE SILOS

SILOXANES  
1804 1805 1810  
GS SILICON POLYMERS  
..SILICONES  
..SILOXANES  
RT % POLYMERS  
POLYSILOXANES  
SILICON COMPOUNDS

SILTS  
USE SEDIMENTS

SILVER  
1703  
GS CHEMICAL ELEMENTS  
#SILVER  
..SILVER ISOTOPES  
METALS  
..NOBLE METALS  
..#SILVER  
...SILVER ISOTOPES  
..TRANSITION METALS  
..#SILVER  
...SILVER ISOTOPES

SILVER ALLOYS  
1701 1704  
GS ALLOYS  
#SILVER ALLOYS  
RT BEARING ALLOYS  
GOLD ALLOYS

SILVER BROMIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
..BROMINE COMPOUNDS

..BROMIDES  
..#SILVER BROMIDES  
..HALIDES  
..BROMIDES  
..#SILVER BROMIDES  
..METAL HALIDES  
...SILVER HALIDES  
...#SILVER BROMIDES  
SILVER COMPOUNDS  
..SILVER HALIDES  
..#SILVER BROMIDES

SILVER CADMIUM BATTERIES  
0302 0603 0904  
UF CADMIUM SILVER BATTERIES  
GS ELECTROCHEMICAL CELLS  
..ELECTRIC BATTERIES  
..STORAGE BATTERIES  
..#SILVER CADMIUM BATTERIES  
RT NICKEL CADMIUM BATTERIES

SILVER CHLORIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
..CHLORINE COMPOUNDS  
..CHLORIDES  
..#SILVER CHLORIDES  
..HALIDES  
..CHLORIDES  
..#SILVER CHLORIDES  
..METAL HALIDES  
...SILVER HALIDES  
...#SILVER CHLORIDES  
SILVER COMPOUNDS  
..SILVER HALIDES  
..#SILVER CHLORIDES

SILVER COMPOUNDS  
0603 1804  
GS #SILVER COMPOUNDS  
..SILVER HALIDES  
..SILVER BROMIDES  
..SILVER CHLORIDES  
..SILVER IODIDES  
..SILVER NITRATES  
..SILVER OXIDES  
RT % CHEMICAL COMPOUNDS  
% GROUP 1B COMPOUNDS  
% METAL COMPOUNDS

SILVER HALIDES  
0603 1804  
GS HALOGEN COMPOUNDS  
..HALIDES  
..METAL HALIDES

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

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0802
GS  MATHEMATICAL LOGIC
    .ALGORITHMS
    .#SIMPLEX METHOD
    OPTIMIZATION
    #SIMPLEX METHOD
    RT  LINEAR PROGRAMMING
        MATHEMATICAL PROGRAMMING
        MATRICES (MATHEMATICS)
        % METHODOLOGY
        PROBLEM SOLVING

SIMPLIFICATION
1902 3407
RT  ASSUMPTIONS
    LINEARIZATION

SIMS (SPECTROMETRY)
USE  SECONDARY ION MASS SPECTROMETRY

SIMULATED ALTITUDE
USE  ALTITUDE SIMULATION

SIMULATED ANNEALING
RT  ANNEALING
    COMPUTERIZED SIMULATION
    LASER ANNEALING
    OPTIMIZATION
    PULSE HEATING
    SIMULATION

SIMULATION
0502 0804 1902 3407 1107 3501 4001
GS  #SIMULATION
    .COMPUTER SYSTEMS SIMULATION
    .COMPUTERIZED SIMULATION
    .ANALOG SIMULATION
    .DIGITAL SIMULATION
    .CONTROL SIMULATION
    .ENVIRONMENT SIMULATION
    .ACOUSTIC SIMULATION
    .ALTITUDE SIMULATION
    .SPACE ENVIRONMENT SIMULATION
    .WEIGHTLESSNESS SIMULATION
    .NEUTRAL BUOYANCY SIMULATION
    .THERMAL SIMULATION
    .EXHAUST FLOW SIMULATION
    .ATMOSPHERIC ENTRY SIMULATION
    .FLIGHT SIMULATION
    .LANDING SIMULATION
    .MOTION SIMULATION
    .RHEOELECTRICAL SIMULATION
    .SOLAR SIMULATION
    .SYSTEMS SIMULATION
    ANALOGIES

RT

BIONICS
BOND GRAPHS
DATA PROCESSING EQUIPMENT
DATA SIMULATION
DECEPTION
GAME THEORY
HEURISTIC METHODS
HYPERVELOCITY PROJECTILES
MATHEMATICAL MODELS
MONTE CARLO METHOD
OPERATIONS RESEARCH
SIMULATED ANNEALING
SIMULATORS
SPACECRAFT CABIN SIMULATORS
SYSTEMS ANALYSIS
VALIDITY
VIRTUAL REALITY
WAR GAMES

SIMULATOR TRAINING
USE  TRAINING SIMULATORS

SIMULATORS
0502 0804 1902 1107 3501
GS  #SIMULATORS
    .CONTROL SIMULATION
    .ENVIRONMENT SIMULATOR
    .LUNAR GRAVITY SIMULATOR
    .SOLAR SIMULATORS
    .SPACE SIMULATORS
    .HIGH VACUUM ORBITAL SIMULATOR
    .LANGLEY COMPLEX COORDINATOR
    .LUNAR ORBIT AND LANDING SIMULATORS
    .MOTION SIMULATORS
    .SHOCK SIMULATORS
    .SHUTTLE ENGINEERING SIMULATOR
    .SHUTTLE MISSION SIMULATOR
    .TARGET SIMULATORS
    .TRAINING SIMULATORS
    .FLIGHT SIMULATORS
    .COCKPIT SIMULATORS
    .SPACECRAFT CABIN SIMULATORS
    .VIBRATION SIMULATORS
    .VERTICAL MOTION SIMULATORS
    ANALOGS
    COMPUTER SYSTEMS SIMULATION
    DUMMIES
    % MISSILE SIMULATORS
    MODELS
    SIMULATION
    % TEST EQUIPMENT
    TEST FACILITIES
    TRAINING DEVICES

SIMULTANEOUS EQUATIONS

1297
1902
RT  % EQUATIONS
    LEAST SQUARES METHOD
    MATRICES (MATHEMATICS)

SIMULTANEOUS IMAGE CORRELATOR
USE  IMAGE CORRELATORS

SINE SERIES
1902
GS  ANALYSIS (MATHEMATICS)
    .CALCULUS
    .SERIES (MATHEMATICS)
    .#SINE SERIES
    .REAL VARIABLES
    .PERIODIC FUNCTIONS
    .TRIGONOMETRIC FUNCTIONS
    .#SINE SERIES
    .SERIES (MATHEMATICS)
    .FUNCTIONS (MATHEMATICS)
    .TRANSCENDENTAL FUNCTIONS
    .PERIODIC FUNCTIONS
    .TRIGONOMETRIC FUNCTIONS
    .#SINE SERIES

SINE WAVES
1002 1902
UF  SINUSOIDS
RT  ELASTIC WAVES
    ELECTROMAGNETIC RADIATION
    TRIGONOMETRIC FUNCTIONS
    WAVELET ANALYSIS
    % WAVES

SINGAPORE
1305
GS  NATIONS
    #SINGAPORE
    RT  ASIA

SINGLE CHANNEL PER CARRIER TRANSMISSION
0702
UF  SPC TRANSMISSION
    TELECOMMUNICATION
    #SINGLE CHANNEL PER CARRIER
    TRANSMISSION
    TRANSMISSION
    .SIGNAL TRANSMISSION
    .DATA TRANSMISSION
    .#SINGLE CHANNEL PER CARRIER
    TRANSMISSION
    RT  CARRIER FREQUENCIES
        CHANNELS (DATA TRANSMISSION)
        SATELLITE COMMUNICATION

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SATELLITE TRANSMISSION  
SPACECRAFT COMMUNICATION  
TELEGRAPH SYSTEMS  
TELEMETRY  
TELEPHONY  
VOICE COMMUNICATION  
VOICE DATA PROCESSING

.T-33 AIRCRAFT  
 .VAMPIRE MK 35 AIRCRAFT  
 .VJ-101 AIRCRAFT  
 .YF-16 AIRCRAFT  
 AIRCRAFT  
 FIGHTER AIRCRAFT  
 GENERAL AVIATION AIRCRAFT

SINGLE CRYSTALS  
1704 2601  
UF MONOCRYSTALS  
GS CRYSTALS  
#SINGLE CRYSTALS  
RT BICRYSTALS  
BOULES  
BRAVAIS CRYSTALS  
BRIDGMAN METHOD  
CRYSTAL LATTICES  
DIAMONDS  
GRAPHITE  
NEEDLES  
PIEZOELECTRIC CRYSTALS  
POLYCRYSTALS  
SPACE PROCESSING  
ULTRAPURE METALS

SINGLE EVENT UPSETS  
1002 1402 1410 2903  
GS RADIATION EFFECTS  
#SINGLE EVENT UPSETS  
RT ASTRONICS  
AVIONICS  
CHARGED PARTICLES  
COSMIC RAYS  
ELECTRON-HOLE DROPS  
INNER RADIATION BELT  
IONIZATION

SINGLE ENGINE AIRCRAFT

0201

GS

- .SINGLE ENGINE AIRCRAFT
- .CESSNA 172 AIRCRAFT
- .CESSNA 205 AIRCRAFT
- .CESSNA 210 AIRCRAFT
- .F-8 AIRCRAFT
- .F-9 AIRCRAFT
- .F-16 AIRCRAFT
- .F-84 AIRCRAFT
- .F-86 AIRCRAFT
- .F-94 AIRCRAFT
- .F-100 AIRCRAFT
- .F-101 AIRCRAFT
- .F-102 AIRCRAFT
- .F-104 AIRCRAFT
- .F-105 AIRCRAFT
- .F-106 AIRCRAFT
- .JAGUAR AIRCRAFT
- .JET PROVOST AIRCRAFT
- .L-29 JET TRAINER
- .MIG AIRCRAFT
- .MIRAGE AIRCRAFT
- .MIRAGE 3 AIRCRAFT
- .P-51 AIRCRAFT
- .P-1127 AIRCRAFT
- .P-1154 AIRCRAFT
- .T-2 AIRCRAFT
- .T-28 AIRCRAFT

SINGLE INPUT SINGLE OUTPUT SYSTEMS  
USE SISO (CONTROL SYSTEMS)

```

SINGLE INSTRUCTION MULTIPLE DATASTREAM
USE SIMD (COMPUTERS)

```

# SINGLE SIDEBAND MODULATION

SINGLE SIDEBAND TRANSMISSION  
0701 0702 0710  
UF SINGLE SIDEBAND MODULATION  
GS TRANSMISSION

```

ELECTROMAGNETIC WAVE TRANSMISSION
..RADIO TRANSMISSION
..#SINGLE SIDEBAND TRANSMISSION
..SIGNAL TRANSMISSION
..RADIO TRANSMISSION
..#SINGLE SIDEBAND TRANSMISSION
..AMPLITUDE MODULATION
DOUBLE SIDEBAND TRANSMISSION
SIDEBANDS
TELEVISION TRANSMISSION
VOICE COMMUNICATION
WAVE PROPAGATION

```

SINGLE STAGE ROCKET VEHICLES  
2808 3106

```

GS
ROCKET VEHICLES
#SINGLE STAGE ROCKET VEHICLES
..AGENA ROCKET VEHICLES
...AGENA A ROCKET VEHICLE
...AGENA B ROCKET VEHICLE
...AGENA C ROCKET VEHICLE
...AGENA D ROCKET VEHICLE
...ARCAS ROCKET VEHICLES
...BLACK BRANT SOUNDING ROCKETS
...BLACK BRANT 1 SOUNDING ROCKET
...BLACK BRANT 2 SOUNDING ROCKET
...BLACK BRANT 3 SOUNDING ROCKET
...BLACK BRANT 4 SOUNDING ROCKET
...BLACK BRANT 5 SOUNDING ROCKET
...BLACK KNIGHT ROCKET VEHICLE
...DORNIER PARAGLIDER ROCKET VEHICLE
...GENIE ROCKET VEHICLE
...HONEST JOHN ROCKET VEHICLE
...HYLA-STAR ROCKET VEHICLE
...LITTLE JOHN ROCKET VEHICLE
...LOKI ROCKET VEHICLE
...NOMAD LAUNCH VEHICLE
...VERONIQUE ROCKET VEHICLES
...VIKING ROCKET VEHICLE
...ZUNI ROCKET VEHICLE
MAULER MISSILE
ROCKET ENGINES
%
RT

```

SINGLE STAGE TO ORBIT VEHICLES  
3105  
GS  
LAUNCH VEHICLES  
. REUSABLE LAUNCH VEHICLES  
. #SINGLE STAGE TO ORBIT VEHICLES  
...HOTOL LAUNCH VEHICLE  
RT  
NASA PROGRAMS  
SPACE SHUTTLES  
SPACE TRANSPORTATION  
%  
X-30 VEHICLE

SINGLE-PHASE FLOW  
1202 1203 0902  
UF ONE-PHASE FLOW  
UNIPHASE FLOW  
GS FLUID FLOW  
RT #SINGLE-PHASE FLOW  
CRITICAL FLOW  
GAS FLOW  
LAMINAR FLOW  
LIQUID FLOW  
MASS FLOW  
MULTIPHASE FLOW  
ORIFICE FLOW  
PIPE FLOW

# NASA THESAURUS HIERARCHICAL UPDATE

STEADY FLOW  
STEAM FLOW  
SUBCRITICAL FLOW  
SUPERCRITICAL FLOW  
TURBULENT FLOW  
TWO PHASE FLOW  
UNIFORM FLOW  
UNSTEADY FLOW

## SINGULAR INTEGRAL EQUATIONS

1902  
GS ANALYSIS (MATHEMATICS)  
.FUNCTIONAL ANALYSIS  
..INTEGRAL EQUATIONS  
..#SINGULAR INTEGRAL EQUATIONS  
RT % EQUATIONS

## SINGULARITY (MATHEMATICS)

0802 1902  
GS ANALYSIS (MATHEMATICS)  
.COMPLEX VARIABLES  
.#SINGULARITY (MATHEMATICS)  
...NAKED SINGULARITIES  
POINTS (MATHEMATICS)  
UNIQUENESS

## SINKHOLES

1306  
GS LANDFORMS  
.STRUCTURAL BASINS  
..#KARST  
..#SINKHOLES  
KETTLES (GEOLOGY)  
STRUCTURAL PROPERTIES (GEOLOGY)

RT

## SINKING

1301 1302 2310  
RT FALLING  
REFRACTION  
SUBMERGING  
WATER IMMERSION

## SINKS

3304  
SN (EXCLUDES PLUMBING  
FIXTURES--LIMITED TO AREAS FOR  
ABSORPTIVE DISPOSAL OF HEAT OR  
FLUIDS)  
GS #SINKS  
..HEAT SINKS  
RT ABSORBERS (MATERIALS)  
DISPOSAL  
% SOURCES

## SINKS (GEOLOGY)

## USE STRUCTURAL BASINS

SINTERED ALUMINUM POWDER  
1507 1704  
GS PARTICLES  
.METAL PARTICLES  
..METAL POWDER  
...POWDERED ALUMINUM  
...#SINTERED ALUMINUM POWDER  
.POWDER (PARTICLES)  
..METAL POWDER  
...POWDERED ALUMINUM  
...#SINTERED ALUMINUM POWDER  
RT ALUMINUM  
POWDER METALLURGY

## SINTERING

1504 1704 3407  
UF PRESINTERING  
GS #SINTERING  
.LIQUID PHASE SINTERING  
RT AGGLOMERATION  
COMBUSTION SYNTHESIS  
FURNACES  
GROWTH  
HEATING  
HOT ISOSTATIC PRESSING  
HOT PRESSING  
METAL POWDER  
MIXED CRYSTALS  
POROSITY  
POWDER METALLURGY  
PYROMETALLURGY  
REACTION BONDING  
ROASTING  
SHRINKAGE  
SIALON

## SINUSES

0404 0405  
GS #SINUSES  
.PARANASAL SINUSES  
RT CAROTID SINUS BODY  
CAROTID SINUS REFLEX  
NOSE (ANATOMY)  
RESPIRATION

## SINUSOIDS

USE SINE WAVES  
SIOUX HELICOPTER  
USE OH-13 HELICOPTER  
SIPHONING  
1202

RT % FLUIDS  
SIPHONS  
THERMOSIPHONS

SIPHONS  
0603 1202  
RT MATERIALS HANDLING  
PIPELINES  
PIPES (TUBES)  
PUMPS  
SIPHONING  
% TUBES

SIR-A  
USE SHUTTLE IMAGING RADAR

SIR-B  
USE SHUTTLE IMAGING RADAR

SIRENS  
0203 1102 2301 3401  
RT HORNS  
NOISE INTENSITY  
SIGNAL GENERATORS  
% SIGNALS  
SOUND GENERATORS  
SOUND INTENSITY  
SOUND TRANSMISSION  
WARNING SYSTEMS

## SIRIO SATELLITE

0706 0709 1904 3006 3107  
GS ARTIFICIAL SATELLITES  
.SYNCHRONOUS SATELLITES  
..#SIRIO SATELLITE  
RT ITALIAN SPACE PROGRAM  
ITALY

## SIRS B SATELLITE

2003 2004 3107  
GS ARTIFICIAL SATELLITES  
.METEOROLOGICAL SATELLITES  
..#SIRS B SATELLITE  
RT METEOROLOGICAL FLIGHT  
METEOROLOGICAL INSTRUMENTS  
SATELLITE OBSERVATION  
UNMANNED SPACECRAFT

## SIRTF

USE SPACE INFRARED TELESCOPE FACILITY  
SIS (SEMICONDUCTORS)  
0905

UF SEMICONDUCTOR INSULATOR  
SEMICONDUCTORS

|                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| GS                                                                                                                                                                                                             | ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>#SIS (SEMICONDUCTORS)                                                                                                                                                                                                                                                                                | SITE SELECTION<br>1101 GS                                                                                                                                                                                                                               | SIZE DETERMINATION<br>1406 GS                                                                                                                                                                                                                            | .GRAIN SIZE<br>FINENESS |
| RT                                                                                                                                                                                                             | BARRIER LAYERS<br>MIM (SEMICONDUCTORS)<br>MIS (SEMICONDUCTORS)<br>MSM (SEMICONDUCTORS)<br>P-N JUNCTIONS<br>PHOTODIODES<br>PHOTOVOLTAIC CELLS<br>SCHOTTKY DIODES<br>SEMICONDUCTOR DIODES<br>SEMICONDUCTOR JUNCTIONS<br>SILICON JUNCTIONS<br>SOI (SEMICONDUCTORS)<br>SOLAR CELLS<br>SOS (SEMICONDUCTORS)<br>TIN OXIDES<br>TRANSISTORS                  | SELECTION<br>#SITE SELECTION<br>AIRPORTS<br>CERTIFICATION<br>% FACILITIES<br>INDUSTRIAL AREAS<br>LAND USE<br>LEASING<br>LOGISTICS<br>OPTIONS<br>RESOURCES<br>ROADS<br>ROUTES<br>SERVICES<br>SITES<br>TERMINAL FACILITIES<br>TRANSPORTATION<br>UTILITIES | % SIZE DETERMINATION<br>#SIZE DETERMINATION<br>.PRECIPITATION PARTICLE MEASUREMENT<br>BODY MEASUREMENT (BIOLOGY)<br>CLASSIFIERS<br>DIMENSIONAL MEASUREMENT<br>MEASUREMENT<br>PARTICLE SIZE DISTRIBUTION<br>% SIZING                                      |                         |
| SIS (SUPERCONDUCTORS)                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| 2303 2602 2604                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| UF SUPERCONDUCTOR INSULATOR<br>SUPERCONDUCTORS                                                                                                                                                                 | SITES<br>1101 1104 1108 3501                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                         | SIZE SEPARATION<br>O602 1406 1504                                                                                                                                                                                                                        |                         |
| GS ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>#SIS (SUPERCONDUCTORS)<br>SUPERCONDUCTING DEVICES<br>#SIS (SUPERCONDUCTORS)<br>HIGH TEMPERATURE SUPERCONDUCTORS<br>JOSEPHSON JUNCTIONS<br>SQUID (DETECTORS) | UF TRACTS<br>GS #SITES<br>.ARIZONA REGIONAL ECOLOGICAL TEST SITE<br>.CENTRAL ATLANTIC REGIONAL ECOL TEST SITE<br>.LANDING SITES<br>.LUNAR LANDING SITES<br>.LAUNCHING SITES<br>.OFFSHORE REACTOR SITES<br>AIRPORT PLANNING<br>BARREN LAND<br>% FACILITIES<br>% LAND<br>% PLOTS<br>POSITION (LOCATION)<br>REGIONS<br>RURAL LAND USE<br>SITE SELECTION |                                                                                                                                                                                                                                                         | UF SIZING (SEPARATION)<br>RT BENEFICIATION<br>% CLASSIFIERS<br>% CLASSIFYING<br>CONCENTRATORS<br>FILTRATION<br>FLOTATION<br>METAL POWDER<br>PARTICLE SIZE DISTRIBUTION<br>POWDER (PARTICLES)<br>% SEPARATION<br>SETTLING<br>% SIZING                     |                         |
| SISO (CONTROL SYSTEMS)                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| 1003                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| UF SINGLE INPUT SINGLE OUTPUT SYSTEMS                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| RT % CONTROL<br>CONTROL STABILITY<br>CONTROL SYSTEMS DESIGN<br>CONTROL THEORY<br>FEEDBACK CONTROL<br>SYSTEMS<br>SYSTEMS STABILITY                                                                              | RT AIRPORT PLANNING<br>BARREN LAND<br>% FACILITIES<br>% LAND<br>% PLOTS<br>POSITION (LOCATION)<br>REGIONS<br>RURAL LAND USE<br>SITE SELECTION                                                                                                                                                                                                        |                                                                                                                                                                                                                                                         | % SIZING<br>1504 1507<br>SN (USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW)<br>RT BODY MEASUREMENT (BIOLOGY)<br>SIZE DETERMINATION<br>SIZE SEPARATION<br>SIZING (SHAPING)<br>SIZING (SURFACE TREATMENT)<br>SIZING MATERIALS |                         |
| SITE DATA PROCESSORS                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| 0708 0801 0802 1101 1102 1104 1106                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| 1108 1109 1410 3405                                                                                                                                                                                            | SITTING POSITION<br>O408 0506 3407                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| UF SDP (COMPUTERS)                                                                                                                                                                                             | RT PRONE POSITION                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| GS DATA PROCESSING EQUIPMENT<br>.COMPUTERS<br>#SITE DATA PROCESSORS<br>APOLLO PROJECT                                                                                                                          | REST<br>SEATS<br>SUPINE POSITION                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |                         |
| RT % DATA<br>DATA LINKS<br>DATA PROCESSING                                                                                                                                                                     | SIZE (DIMENSIONS)<br>1902 1903 3408<br>GS #SIZE (DIMENSIONS)                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                         | SIZING (SEPARATION)<br>USE SIZE SEPARATION<br>SIZING (SHAPING)<br>1504 1704 3404                                                                                                                                                                         |                         |
|                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          | 1300                    |

[illegible]

|                                     |                               |                          |                          |
|-------------------------------------|-------------------------------|--------------------------|--------------------------|
| SKIN TEMPERATURE (NON-BIOLOGICAL)   | RT                            | FOREHEAD                 | STRATOSPHERE RADIATION   |
| 0101 0102 3106 3303                 |                               | INTERCRANIAL CIRCULATION | SUNLIGHT                 |
| GS SURFACE PROPERTIES               |                               |                          | THERMAL RADIATION        |
| .SURFACE TEMPERATURE                |                               |                          | TROPOSPHERIC RADIATION   |
| .#SKIN TEMPERATURE (NON-BIOLOGICAL) | SKY                           |                          |                          |
| TEMPERATURE                         | 1301 1302 2003 3001           |                          | SKY SURVEYS (ASTRONOMY)  |
| .SURFACE TEMPERATURE                | GS #SKY                       |                          | 3001 3405                |
| .#SKIN TEMPERATURE (NON-BIOLOGICAL) | RT                            |                          | GS OBSERVATION           |
| AERODYNAMIC HEATING                 |                               |                          | #SKY SURVEYS (ASTRONOMY) |
| AEROTHERMODYNAMICS                  |                               |                          | SURVEYS                  |
|                                     |                               |                          | #SKY SURVEYS (ASTRONOMY) |
|                                     |                               |                          | ASTRONOMICAL CATALOGS    |
|                                     |                               |                          | ASTRONOMY                |
|                                     |                               |                          | INDEXES (DOCUMENTATION)  |
|                                     |                               |                          | NORTHERN SKY             |
|                                     |                               |                          | SOUTHERN SKY             |
| SKINNER BOXES                       |                               |                          |                          |
| 0408 0410                           |                               |                          |                          |
| RT BEHAVIOR                         |                               |                          |                          |
| PSYCHOLOGICAL TESTS                 | SKY BRIGHTNESS                |                          |                          |
| PSYCHOMETRICS                       | 1301 1302 2003 2306 2902 2903 |                          |                          |
|                                     | GS ELECTROMAGNETIC PROPERTIES |                          |                          |
|                                     | .OPTICAL PROPERTIES           |                          |                          |
|                                     | .#SKY BRIGHTNESS              |                          |                          |
|                                     | RT AIRGLOW                    |                          |                          |
|                                     | AURORAS                       |                          |                          |
|                                     | BRIGHTNESS                    |                          |                          |
|                                     | CLOUD COVER                   |                          |                          |
|                                     | DAYTIME                       |                          |                          |
|                                     | GEGENSCHEIN                   |                          |                          |
|                                     | GLARE                         |                          |                          |
|                                     | LIGHT (VISIBLE RADIATION)     |                          |                          |
|                                     | LIGHT EMISSION                |                          |                          |
|                                     | LUMINANCE                     |                          |                          |
|                                     | NIGHT                         |                          |                          |
|                                     | NIGHT SKY                     |                          |                          |
|                                     | NIGHTGLOW                     |                          |                          |
|                                     | SOLAR RADIATION               |                          |                          |
|                                     | SUNLIGHT                      |                          |                          |
|                                     | ZODIACAL LIGHT                |                          |                          |
| SKIS                                |                               |                          |                          |
| 0203                                |                               |                          |                          |
| RT HYDROFOILS                       |                               |                          |                          |
| HYDROPLANES (SURFACES)              |                               |                          |                          |
| LANDING GEAR                        |                               |                          |                          |
| SKUA ROCKET VEHICLES                |                               |                          |                          |
| 3106 3108                           |                               |                          |                          |
| GS ROCKET VEHICLES                  | SKY RADIATION                 |                          |                          |
| .SOUNDING ROCKETS                   | 1301 1302 2902 2903           |                          |                          |
| .#SKUA ROCKET VEHICLES              | GS ATMOSPHERIC RADIATION      |                          |                          |
| SOLID PROPELLANT ROCKET ENGINES     | #SKY RADIATION                |                          |                          |
| % VEHICLES                          | .AIRGLOW                      |                          |                          |
|                                     | ...GEOCORONAL EMISSIONS       |                          |                          |
|                                     | ...NIGHTGLOW                  |                          |                          |
|                                     | ...TWILIGHT GLOW              |                          |                          |
|                                     | .DAYGLOW                      |                          |                          |
|                                     | ELECTROMAGNETIC RADIATION     |                          |                          |
|                                     | .LIGHT (VISIBLE RADIATION)    |                          |                          |
|                                     | .#SKY RADIATION               |                          |                          |
|                                     | ...AIRGLOW                    |                          |                          |
|                                     | ...GEOCORONAL EMISSIONS       |                          |                          |
|                                     | ...NIGHTGLOW                  |                          |                          |
|                                     | ...TWILIGHT GLOW              |                          |                          |
|                                     | ...DAYGLOW                    |                          |                          |
|                                     | BACKGROUND RADIATION          |                          |                          |
|                                     | PYRANOMETERS                  |                          |                          |
|                                     | % RADIATION                   |                          |                          |
| SKULL                               |                               |                          |                          |
| 0404 0405                           |                               |                          |                          |
| GS ANATOMY                          |                               |                          |                          |
| .HEAD (ANATOMY)                     |                               |                          |                          |
| .#SKULL                             |                               |                          |                          |
| ...CRANIUM                          |                               |                          |                          |
| ...INTRACRANIAL CAVITY              |                               |                          |                          |
| ...MASTOIDS                         |                               |                          |                          |
| .MUSCULOSKELETAL SYSTEM             |                               |                          |                          |
| .BONES                              |                               |                          |                          |
| .#SKULL                             |                               |                          |                          |
| ...CRANIUM                          |                               |                          |                          |
| ...INTRACRANIAL CAVITY              |                               |                          |                          |
| ...MASTOIDS                         |                               |                          |                          |



[illegible]

[illegible]

[illegible]

[illegible]

|             |                                                                                                                                                                                                                                                              |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT          | MELTING<br>% METALLURGY<br>REDUCTION (CHEMISTRY)<br>REFINING                                                                                                                                                                                                 | VAPORS<br>VISIBILITY                                                                                                                                       | ..#SMS 1<br>..SYNCHRONOUS METEOROLOGICAL<br>SATELLITE<br>..#SMS 1<br>..SYNCHRONOUS SATELLITES<br>..SYNCHRONOUS EARTH OBSERVATORY<br>SATELLITE<br>..#SMS 1<br>..SYNCHRONOUS METEOROLOGICAL<br>SATELLITE<br>..#SMS 1<br>GOES 2<br>NOAA SATELLITES                                                                                                        |
| SMITH CHART |                                                                                                                                                                                                                                                              |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                        |
| 0710        | 2309 2402                                                                                                                                                                                                                                                    | SMOKE ABATEMENT<br>O504 O505                                                                                                                               | RT                                                                                                                                                                                                                                                                                                                                                     |
| RT          | ELECTRICAL IMPEDANCE<br>IMPEDANCE<br>POLAR COORDINATES<br>REACTANCE<br>STANDING WAVE RATIOS<br>TRANSMISSION LINES<br>WAVEGUIDES                                                                                                                              | AIR POLLUTION<br>CARBON DIOXIDE REMOVAL<br>EXHAUST GASES<br>POLLUTION<br>SOOT                                                                              |                                                                                                                                                                                                                                                                                                                                                        |
| SMM-A       |                                                                                                                                                                                                                                                              | SMOKE DETECTORS<br>O603                                                                                                                                    | RT                                                                                                                                                                                                                                                                                                                                                     |
| USE         | SOLAR MAXIMUM MISSION-A                                                                                                                                                                                                                                      | GS                                                                                                                                                         | SMS 2<br>3107<br>GS                                                                                                                                                                                                                                                                                                                                    |
| SMOG        |                                                                                                                                                                                                                                                              | MEASURING INSTRUMENTS<br>.INDICATING INSTRUMENTS<br>..#SMOKE DETECTORS<br>FIRE PREVENTION<br>FUMES<br>GAS DETECTORS<br>SAFETY DEVICES<br>SIGNAL PROCESSING | ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>..SYNCHRONOUS EARTH OBSERVATORY<br>SATELLITE<br>..#SMS 2<br>..SYNCHRONOUS METEOROLOGICAL<br>SATELLITE<br>..#SMS 2<br>..SYNCHRONOUS SATELLITES<br>..SYNCHRONOUS EARTH OBSERVATORY<br>SATELLITE<br>..#SMS 2<br>..SYNCHRONOUS METEOROLOGICAL<br>SATELLITE<br>..#SMS 2<br>GOES 2<br>NOAA SATELLITES |
| 0603        | 1202 2001 2003                                                                                                                                                                                                                                               | SMOKE TRAILS<br>O202 2003 3301                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                        |
| RT          | AIR POLLUTION<br>AIR SAMPLING<br>CARBON MONOXIDE<br>COMBUSTION PRODUCTS<br>ENVIRONMENTAL CHEMISTRY<br>EXHAUST GASES<br>FLAMES<br>FOG<br>HYDROCARBON COMBUSTION<br>HYDROCARBON POISONING<br>LEAD POISONING<br>PARTICULATES<br>SMOKE                           | WIND DIRECTION<br>WIND MEASUREMENT<br>WIND PROFILES                                                                                                        |                                                                                                                                                                                                                                                                                                                                                        |
| SMOKE       |                                                                                                                                                                                                                                                              | SMOOTHING<br>O705 0710 1002 1902 1905<br>GS #SMOOTHING<br>.DATA SMOOTHING                                                                                  | RT                                                                                                                                                                                                                                                                                                                                                     |
| 0505        | 0603 2003 3301                                                                                                                                                                                                                                               | RT                                                                                                                                                         | SMU (MANEUVERING UNITS)<br>USE SELF MANEUVERING UNITS                                                                                                                                                                                                                                                                                                  |
| GS          | MIXTURES<br>.DISPERSIONS<br>..PLASTISOLS<br>..#SMOKE<br>AEROSOLS<br>AIR POLLUTION<br>COMBUSTION PRODUCTS<br>DUST<br>EXHAUST GASES<br>FIRE DAMAGE<br>FOG<br>FOREST FIRES<br>FUMES<br>HAZE DETECTION<br>% MARKERS<br>PARTICLES<br>PARTICULATES<br>SMOG<br>SOOT | ADJUSTING<br>FLATTENING<br>HONING<br>LEVELING<br>PLANING<br>POLISHING<br>ROUGHNESS                                                                         | SNAILS<br>O402<br>GS                                                                                                                                                                                                                                                                                                                                   |
| RT          |                                                                                                                                                                                                                                                              | SMS<br>USE SYNCHRONOUS METEOROLOGICAL<br>SATELLITE                                                                                                         | ANIMALS<br>.INVERTEBRATES<br>..MOLLUSKS<br>..#SNAILS                                                                                                                                                                                                                                                                                                   |
|             |                                                                                                                                                                                                                                                              | SMS (SHUTTLE)<br>USE SHUTTLE MISSION SIMULATOR                                                                                                             | SNAKES<br>O402<br>GS                                                                                                                                                                                                                                                                                                                                   |
|             |                                                                                                                                                                                                                                                              | SMS 1<br>3107<br>GS                                                                                                                                        | ANIMALS<br>.VERTEBRATES<br>..REPTILES<br>..#SNAKES                                                                                                                                                                                                                                                                                                     |
|             |                                                                                                                                                                                                                                                              | ARTIFICIAL SATELLITES<br>.METEOROLOGICAL SATELLITES<br>..SYNCHRONOUS EARTH OBSERVATORY<br>SATELLITE                                                        | SNAKING<br>USE LATERAL OSCILLATION<br>SNAP                                                                                                                                                                                                                                                                                                             |

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# NASA THESAURUS HIERARCHICAL UPDATE

2201 2204 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 8  
 ...SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 8  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 8  
 ...SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 8  
 .NUCLEAR POWER REACTORS  
 .SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 8  
 NUCLEAR REACTORS  
 .NUCLEAR POWER REACTORS  
 .SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 8  
 RT HEAT EXCHANGERS  
 SPACE POWER UNIT REACTORS  
 TURBOGENERATORS  
 SNAP 9A  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 9A  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .RADIOISOTOPE BATTERIES  
 ..#SNAP 9A  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 9A  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 9A  
 SNAP 10A  
 2201 2204 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 10A  
 ...SPACE POWER REACTORS

...FISSION ELECTRIC CELLS  
 ...#SNAP 10A  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 10A  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 10A  
 ...SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 10A  
 .NUCLEAR POWER REACTORS  
 .SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 10A  
 NUCLEAR REACTORS  
 .NUCLEAR POWER REACTORS  
 .SPACE POWER REACTORS  
 ...FISSION ELECTRIC CELLS  
 ...#SNAP 10A  
 RT HEAT EXCHANGERS  
 SNAPSHOT SATELLITE  
 SNAP 11  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 11  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .RADIOISOTOPE BATTERIES  
 ..#SNAP 11  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 11  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 11  
 SNAP 13  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 13  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .RADIOISOTOPE BATTERIES  
 ..#SNAP 13  
 ..THERMIONIC CONVERTERS

NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 13  
 RT THERMIONIC POWER GENERATION  
 SNAP 15  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 15  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .RADIOISOTOPE BATTERIES  
 ..#SNAP 15  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 15  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 15  
 SNAP 17  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 17  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .RADIOISOTOPE BATTERIES  
 ..#SNAP 17  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 17  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 17  
 SNAP 19  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ...#SNAP 19  
 .ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 .RADIOISOTOPE BATTERIES  
 ..#SNAP 19  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 19  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP

..#SNAP 19  
 SNAP 21  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 21  
 ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 ..RADIOISOTOPE BATTERIES  
 ..#SNAP 21  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 21  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 21  
 ..#SNAP 19  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 29  
 ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 ..RADIOISOTOPE BATTERIES  
 ..#SNAP 29  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 29  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 29  
 SNAP 50  
 2201 2802  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 50  
 ..SPACE POWER REACTORS  
 ..#SNAP 50  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 50  
 ..SPACE POWER REACTORS  
 ..#SNAP 50  
 RT SPACE POWER UNIT REACTORS  
 SNAPSHOT SATELLITE  
 3107  
 GS ARTIFICIAL SATELLITES  
 #SNAPSHOT SATELLITE  
 RT SNAP 10A  
 SNAPTRAN REACTOR  
 2201 2204  
 RT % REACTORS  
 SNAP  
 SNATCHING  
 USE SPACECRAFT RECOVERY  
 SNEAK CIRCUIT ANALYSIS  
 0902  
 GS NETWORK ANALYSIS  
 #SNEAK CIRCUIT ANALYSIS  
 RT AUTOMATIC TEST EQUIPMENT  
 CIRCUIT PROTECTION  
 CIRCUIT RELIABILITY  
 CRITICAL PATH METHOD  
 ELECTRIC NETWORKS  
 ELECTRICAL FAULTS  
 SNAP 27  
 2201 2802 2803  
 GS AUXILIARY POWER SOURCES  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 27  
 ELECTRIC GENERATORS  
 .DIRECT POWER GENERATORS  
 ..RADIOISOTOPE BATTERIES  
 ..#SNAP 27  
 ..THERMOELECTRIC GENERATORS  
 ..#SNAP 27  
 NUCLEAR ELECTRIC POWER GENERATION  
 .NUCLEAR AUXILIARY POWER UNITS  
 ..SNAP  
 ..#SNAP 27  
 SNAP 29  
 2201 2802 2803  
 GS PRECIPITATION (METEOROLOGY)  
 #SNOW  
 RT ACID RAIN  
 CIRQUES (LANDFORMS)  
 CLOUD GLACIATION  
 GRAUPEL  
 ICE FORMATION  
 SLUSH  
 STORMS (METEOROLOGY)  
 SNOW AERIAL APPLICATOR AIRCRAFT S-2B  
 USE S-2 AIRCRAFT  
 SNOW AIRCRAFT  
 0201 0204  
 GS #SNOW AIRCRAFT  
 .S-2 AIRCRAFT  
 RT % AIRCRAFT  
 UTILITY AIRCRAFT  
 SNOW COVER  
 2001 2003 2303  
 GS PRECIPITATION (METEOROLOGY)  
 #SNOW COVER  
 RT CLOUD GLACIATION  
 COLD WEATHER



# NASA THESAURUS HIERARCHICAL UPDATE

|                                 |  |  |  |
|---------------------------------|--|--|--|
| STORM DAMAGE                    |  |  |  |
| STORMS                          |  |  |  |
| STORMS (METEOROLOGY)            |  |  |  |
| SNOW S-2 AIRCRAFT               |  |  |  |
| USE S-2 AIRCRAFT                |  |  |  |
| SNOWFLOW EFFECT                 |  |  |  |
| USE PLASMA DYNAMICS             |  |  |  |
| SNOWSTORMS                      |  |  |  |
| 1308 2001 2003                  |  |  |  |
| GS                              |  |  |  |
| STORMS                          |  |  |  |
| .STORMS (METEOROLOGY)           |  |  |  |
| .#SNOWSTORMS                    |  |  |  |
| CLIMATOLOGY                     |  |  |  |
| PRECIPITATION (METEOROLOGY)     |  |  |  |
| STORM ENHANCEMENT               |  |  |  |
| STORM SUPPRESSION               |  |  |  |
| WEATHER FORECASTING             |  |  |  |
| WEATHER MODIFICATION            |  |  |  |
| % SOAKING                       |  |  |  |
| 0602 1701 1704 3303             |  |  |  |
| SN                              |  |  |  |
| (USE OF A MORE SPECIFIC TERM IS |  |  |  |
| RECOMMENDED--CONSULT THE TERMS  |  |  |  |
| LISTED BELOW)                   |  |  |  |
| RT                              |  |  |  |
| BATHS                           |  |  |  |
| HEAT TREATMENT                  |  |  |  |
| HEATING                         |  |  |  |
| SUBMERGING                      |  |  |  |
| WATER IMMERSION                 |  |  |  |
| WETTING                         |  |  |  |
| SOAPS                           |  |  |  |
| 0504                            |  |  |  |
| RT                              |  |  |  |
| DETERGENTS                      |  |  |  |
| STEARATES                       |  |  |  |
| SURFACTANTS                     |  |  |  |
| WETTING                         |  |  |  |
| SOARING                         |  |  |  |
| 0101 0201 0205                  |  |  |  |
| RT                              |  |  |  |
| CLIMBING FLIGHT                 |  |  |  |
| COASTING FLIGHT                 |  |  |  |
| % FLIGHT                        |  |  |  |
| GLIDERS                         |  |  |  |
| GLIDING                         |  |  |  |
| HANG GLIDERS                    |  |  |  |
| HORIZONTAL FLIGHT               |  |  |  |
| MAN POWERED AIRCRAFT            |  |  |  |
| VERTICAL AIR CURRENTS           |  |  |  |
| SOBOLEV SPACE                   |  |  |  |
| 1902                            |  |  |  |
| ALGEBRA                         |  |  |  |
| .VECTOR SPACES                  |  |  |  |
| .BANACH SPACE                   |  |  |  |
| ...HILBERT SPACE                |  |  |  |
| ...#SOBOLEV SPACE               |  |  |  |
| ANALYSIS (MATHEMATICS)          |  |  |  |
| .FUNCTION SPACE                 |  |  |  |
| .BANACH SPACE                   |  |  |  |
| ...HILBERT SPACE                |  |  |  |
| ...#SOBOLEV SPACE               |  |  |  |
| BOUNDARY VALUE PROBLEMS         |  |  |  |
| EUCLIDEAN GEOMETRY              |  |  |  |
| RT                              |  |  |  |
| FACTORS                         |  |  |  |
| 3402 3403                       |  |  |  |
| SOCIOLOGY                       |  |  |  |
| #SOCIAL FACTORS                 |  |  |  |
| ...ETHNIC FACTORS               |  |  |  |
| ANTHROPOLOGY                    |  |  |  |
| CRIME                           |  |  |  |
| CULTURE (SOCIAL SCIENCES)       |  |  |  |
| POLICE                          |  |  |  |
| RACE FACTORS                    |  |  |  |
| SPACE PSYCHOLOGY                |  |  |  |
| STARSITE PROGRAM                |  |  |  |
| URBAN PLANNING                  |  |  |  |
| URBAN RESEARCH                  |  |  |  |
| % VARIABLE                      |  |  |  |
| SOCIAL ISOLATION                |  |  |  |
| 0410 3402                       |  |  |  |
| GS                              |  |  |  |
| ISOLATION                       |  |  |  |
| #SOCIAL ISOLATION               |  |  |  |
| SOCIOLOGY                       |  |  |  |
| SOCIAL PSYCHIATRY               |  |  |  |
| 0405 0408 0410 3402             |  |  |  |
| GS                              |  |  |  |
| MEDICAL SCIENCE                 |  |  |  |
| .PSYCHIATRY                     |  |  |  |
| .#SOCIAL PSYCHIATRY             |  |  |  |
| SOCIOLOGY                       |  |  |  |
| 3402                            |  |  |  |
| GS                              |  |  |  |
| #SOCIOLOGY                      |  |  |  |
| .SOCIAL FACTORS                 |  |  |  |
| ...ETHNIC FACTORS               |  |  |  |
| ANTHROPOLOGY                    |  |  |  |
| CASE HISTORIES                  |  |  |  |
| CITIES                          |  |  |  |
| COMMUNITIES                     |  |  |  |
| 1311                            |  |  |  |
| CULTURE (SOCIAL SCIENCES)       |  |  |  |
| DEMOGRAPHY                      |  |  |  |
| DEPENDENCE                      |  |  |  |
| GROUP DYNAMICS                  |  |  |  |
| HUMAN RELATIONS                 |  |  |  |
| MINORITIES                      |  |  |  |
| POLITICS                        |  |  |  |
| RACE FACTORS                    |  |  |  |
| RETIREMENT                      |  |  |  |
| SOCIAL ISOLATION                |  |  |  |
| SOCIAL PSYCHIATRY               |  |  |  |
| SYSTEMS ANALYSIS                |  |  |  |
| URBAN PLANNING                  |  |  |  |
| SOCKS                           |  |  |  |
| 1811                            |  |  |  |
| GS                              |  |  |  |
| CLOTHING                        |  |  |  |
| #SOCKS                          |  |  |  |
| FABRICS                         |  |  |  |
| SHOES                           |  |  |  |
| SOD                             |  |  |  |
| 0404 1305                       |  |  |  |
| RT                              |  |  |  |
| CANOPIES (VEGETATION)           |  |  |  |
| FARMLANDS                       |  |  |  |
| GRASSES                         |  |  |  |
| GRASSLANDS                      |  |  |  |
| LAND                            |  |  |  |
| PLOWING                         |  |  |  |
| SODALITE                        |  |  |  |
| 0605 1407 2306                  |  |  |  |
| RT                              |  |  |  |
| CHEMICAL REACTIONS              |  |  |  |
| PHOTOCHEMICAL REACTIONS         |  |  |  |
| PHOTOCHROMISM                   |  |  |  |
| SODAR                           |  |  |  |
| 2301                            |  |  |  |
| RT                              |  |  |  |
| ACOUSTIC SCATTERING             |  |  |  |
| ATMOSPHERIC TEMPERATURE         |  |  |  |
| % INSTRUMENTS                   |  |  |  |
| MEASURING INSTRUMENTS           |  |  |  |
| METEOROLOGICAL INSTRUMENTS      |  |  |  |
| METEOROLOGY                     |  |  |  |
| SOUND DETECTING AND RANGING     |  |  |  |
| TEMPERATURE MEASUREMENT         |  |  |  |
| SODIUM                          |  |  |  |
| 0603                            |  |  |  |
| GS                              |  |  |  |
| CHEMICAL ELEMENTS               |  |  |  |
| .ALKALI METALS                  |  |  |  |
| .#SODIUM                        |  |  |  |
| ...LIQUID SODIUM                |  |  |  |
| ...SODIUM ISOTOPES              |  |  |  |
| ....SODIUM 22                   |  |  |  |

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.....SODIUM 24
...SODIUM VAPOR
METALS
.ALKALI METALS
.#SODIUM
...LIQUID SODIUM
...SODIUM ISOTOPES
...SODIUM 22
...SODIUM 24
...SODIUM VAPOR
DAWSONITE
ELECTROLYTE METABOLISM
LIQUID METAL COOLED REACTORS

RT
SODIUM ALLOYS
1701 1704
GS ALLOYS
.#SODIUM ALLOYS

SODIUM AZIDES
0603 1804
GS NITROGEN COMPOUNDS
.AZIDES (INORGANIC)
.#SODIUM AZIDES
.AZIDES (ORGANIC)
.#SODIUM AZIDES
SODIUM COMPOUNDS
#SODIUM AZIDES
DETONATORS
EXPLOSIVES

RT
SODIUM BROMIDES
0603 1804
GS HALOGEN COMPOUNDS
.BROMINE COMPOUNDS
..BROMIDES
..#SODIUM BROMIDES
.HALIDES
..BROMIDES
..#SODIUM BROMIDES
..METAL HALIDES
...ALKALI HALIDES
...#SODIUM BROMIDES
SODIUM COMPOUNDS
#SODIUM BROMIDES

SODIUM CARBONATES
0603 1808
GS CARBON COMPOUNDS
.CARBONATES
.#SODIUM CARBONATES
SODIUM COMPOUNDS
#SODIUM CARBONATES
DAWSONITE

RT
SODIUM CHLORIDES
0603 1804
GS HALOGEN COMPOUNDS
.CHLORINE COMPOUNDS
..CHLORIDES
..#SODIUM CHLORIDES
.HALIDES
..CHLORIDES
..#SODIUM CHLORIDES
..METAL HALIDES
...ALKALI HALIDES
...#SODIUM CHLORIDES
SODIUM COMPOUNDS
#SODIUM CHLORIDES
MOLTEN SALTS
SALT BEDS
% SALTS

RT
SODIUM CHLORODIFLUOROACETATES
1808
GS ACETATES
#SODIUM CHLORODIFLUOROACETATES
ESTERS
#SODIUM CHLORODIFLUOROACETATES

SODIUM CHROMITES
0603 1804
GS CHROMIUM COMPOUNDS
#SODIUM CHROMITES
SODIUM COMPOUNDS
#SODIUM CHROMITES

SODIUM COMPOUNDS
0603 1804 1808
GS #SODIUM COMPOUNDS
.CRYOLITE
.NEMBUTAL (TRADEMARK)
.NEPHELINE
.SODIUM AZIDES
.SODIUM BROMIDES
.SODIUM CARBONATES
.SODIUM CHLORIDES
.SODIUM CHROMITES
.SODIUM FLUORIDES
.SODIUM GALLATES
.SODIUM HYDRIDES
.SODIUM HYDROXIDES
.SODIUM IODIDES
.SODIUM NITRATES
.SODIUM PEROXIDES
.SODIUM SALICYLATES
.SODIUM SILICATES
..SPODUMENE
..TALC
..TOURMALINE

SODIUM GALLATES
0603 1804
GS GALLIUM COMPOUNDS
.GALLATES
.#SODIUM GALLATES
SODIUM COMPOUNDS
#SODIUM GALLATES

SODIUM GRAPHITE REACTORS
2203 2204
UF SGR (NUCLEAR REACTORS)
GS NUCLEAR REACTORS
.LIQUID COOLED REACTORS
..LIQUID METAL COOLED REACTORS
..#SODIUM GRAPHITE REACTORS
HALLAM NUCLEAR POWER FACILITY
NUCLEAR POWER REACTORS

RT
SODIUM HYDRIDES
0603 1804
GS HYDROGEN COMPOUNDS
.HYDRIDES
..METAL HYDRIDES
..#SODIUM HYDRIDES
SODIUM COMPOUNDS

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[illegible]

[illegible]

|                      |                                    |                     |                                     |                     |                    |
|----------------------|------------------------------------|---------------------|-------------------------------------|---------------------|--------------------|
| GS                   | RELIABILITY                        | 0904                | SILICON-ON-INSULATOR SEMICONDUCTORS | RT                  | #SOIL MOISTURE     |
|                      | #SOFTWARE RELIABILITY              | UF                  | ELECTRONIC EQUIPMENT                |                     | LYSIMETERS         |
| RT                   | ..COMPUTER PROGRAM INTEGRITY       | GS                  | .SOLID STATE DEVICES                |                     | MOISTURE CONTENT   |
|                      | COMPUTER PROGRAMMING               |                     | ..SEMICONDUCTOR DEVICES             |                     | PLANT STRESS       |
|                      | COMPUTER PROGRAMS                  |                     | ..#SOI (SEMICONDUCTORS)             |                     | SOILS              |
|                      | COMPUTER SYSTEMS PERFORMANCE       | RT                  | FIELD EFFECT TRANSISTORS            |                     | VEGETATION GROWTH  |
|                      | PROGRAM VERIFICATION (COMPUTERS)   |                     | WELD OXIDE SEMICONDUCTORS           |                     |                    |
|                      | RELIABILITY ANALYSIS               |                     | SILICON FILMS                       | SOIL SCIENCE        |                    |
|                      | SOFTWARE ENGINEERING               |                     | SILICON JUNCTIONS                   | 0403 0404 1306 1806 |                    |
| SOFTWARE REUSE       |                                    |                     | SILICON TRANSISTORS                 | UF                  | PEDOLOGY           |
| 0802                 |                                    |                     | SIS (SEMICONDUCTORS)                | RT                  | AGRICULTURE        |
| GS                   | UTILIZATION                        |                     | SOS (SEMICONDUCTORS)                |                     | CONSERVATION       |
|                      | .REUSE                             |                     |                                     |                     | EROSION            |
|                      | ..#SOFTWARE REUSE                  | SOIL EROSION        |                                     |                     | SOILS              |
| RT                   | COMPUTER PROGRAMMING               | 2003 1306           |                                     |                     | VEGETATION GROWTH  |
|                      | COMPUTER PROGRAMS                  | GS                  | EROSION                             |                     |                    |
|                      | PRODUCTIVITY                       |                     | #SOIL EROSION                       | SOILS               |                    |
|                      | SOFTWARE ENGINEERING               | RT                  | ABRASION                            | 0404 3009 1306      |                    |
|                      | SOFTWARE TOOLS                     |                     | ATMOSPHERIC EFFECTS                 | GS                  | #SOILS             |
| SOFTWARE TOOLS       |                                    |                     | DETERIORATION                       |                     | .ALLUVIUM          |
| 0802 4001            |                                    |                     | ENVIRONMENT EFFECTS                 |                     | .DIRT              |
| RT                   | ARCHITECTURE (COMPUTERS)           |                     | HYDROGEOLOGY                        |                     | .GRAVELS           |
|                      | COMPUTER PROGRAMMING               |                     | LANDSLIDES                          |                     | .LATERITES         |
|                      | COMPUTER PROGRAMS                  |                     | OUTLIERS (LANDFORMS)                |                     | .LUNAR SOIL        |
|                      | COMPUTER SYSTEMS DESIGN            |                     | RAIN EROSION                        |                     | ..LUNAR DUST       |
|                      | COMPUTER SYSTEMS PROGRAMS          |                     | RAIN IMPACT DAMAGE                  |                     | .MUD               |
|                      | DATA BASE MANAGEMENT SYSTEMS       |                     | SOILS                               |                     | .PERMAFROST        |
|                      | PROGRAM VERIFICATION (COMPUTERS)   |                     | WATER EROSION                       |                     | .SANDS             |
|                      | PROGRAMMING ENVIRONMENTS           |                     | WEATHERING                          |                     | ..MONAZITE SANDS   |
|                      | REVERSE ENGINEERING                |                     | WIND EFFECTS                        |                     | ..TAR SANDS        |
|                      | SCIENTIFIC VISUALIZATION           | SOIL MAPPING        |                                     | RT                  | ANDESITE           |
|                      | SOFTWARE ENGINEERING               | 1303 1305 1306 1308 |                                     |                     | ANORTHOSITE        |
|                      | SOFTWARE REUSE                     | GS                  | MAPPING                             |                     | ATAHITE            |
|                      | WINDOWS (COMPUTER PROGRAMS)        |                     | #SOIL MAPPING                       |                     | BARREN LAND        |
| SOHO MISSION         |                                    | RT                  | GEOGRAPHIC APPLICATIONS PROGRAM     |                     | BASALT             |
| 1308 3009 3104 3409  |                                    |                     | MAPS                                |                     | BEDROCK            |
| UF                   | SOLAR AND HELIOSPHERIC OBSERVATORY |                     | PHOTOMAPPING                        |                     | BENTONITE          |
| GS                   | SPACE MISSIONS                     |                     | SOILS                               |                     | BOREHOLES          |
|                      | #SOHO MISSION                      |                     | SPOT (FRENCH SATELLITE)             |                     | BRECCIA            |
| RT                   | CLUSTER MISSION                    |                     | SURVEYS                             |                     | CARBONACEOUS ROCKS |
|                      | ESA SATELLITES                     |                     | TERRAIN ANALYSIS                    |                     | CLAYS              |
|                      | EUROPEAN SPACE PROGRAMS            |                     |                                     |                     | COAL               |
|                      | HELIOSPHERE                        | SOIL MECHANICS      |                                     |                     | CONSERVATION       |
|                      | INTERNATIONAL COOPERATION          | 1306 1308 1806      |                                     |                     | CULTIVATION        |
| % MISSIONS           |                                    | RT                  | CRUSTAL FRACTURES                   |                     | DELTAS             |
|                      | SCIENTIFIC SATELLITES              |                     | FRACTURE MECHANICS                  |                     | DIORITE            |
|                      | SOLAR CORONA                       |                     | GEOTECHNICAL ENGINEERING            |                     | DUNITE             |
|                      | SOLAR INTERIOR                     |                     | GEOTECHNICAL FABRICS                |                     | EARTH RESOURCES    |
|                      | SOLAR OBSERVATORIES                |                     | ROCK MECHANICS                      |                     | ECLOGITE           |
|                      | SOLAR WIND                         |                     |                                     |                     | ENSTATITE          |
| SOI (SEMICONDUCTORS) |                                    | SOIL MOISTURE       |                                     |                     | FORMATIONS         |
|                      |                                    | 1306 1308           |                                     |                     | GEOLOGY            |
|                      |                                    | GS                  | MOISTURE                            |                     | GNEISS             |
|                      |                                    |                     |                                     |                     | GRANITE            |
|                      |                                    |                     |                                     |                     | IGNEOUS ROCKS      |

[illegible]

[illegible]

RT #SOLAR COOLING  
 COOLING SYSTEMS  
 DOMESTIC ENERGY  
 ENERGY TECHNOLOGY  
 RESIDENTIAL ENERGY  
 SPACE COOLING (BUILDINGS)  
 SUN

SOLAR CORONA  
 0705 2306 2402 2901 2902 2903 3001  
 UF SOLAR NEBULA  
 GS CORONAS  
 .STELLAR CORONAS  
 .#SOLAR CORONA  
 ...CORONAL HOLES  
 ...CORONAL LOOPS  
 CHROMOSPHERE  
 ELECTRIC CORONA  
 MAGNETIC CLOUDS  
 NEBULAE  
 SOHO MISSION  
 SOLAR TRANSITION REGION  
 STELLAR STRUCTURE  
 SUN

RT SOLAR CORPUSCULAR RADIATION  
 2901 2902  
 UF SOLAR STREAMS  
 GS EXTRATERRESTRIAL RADIATION  
 .SOLAR RADIATION  
 .#SOLAR CORPUSCULAR RADIATION  
 ...SOLAR ELECTRONS  
 ...SOLAR NEUTRONS  
 ...SOLAR NEUTRONS  
 ...SOLAR PROTONS  
 PARTICLES  
 .CORPUSCULAR RADIATION  
 .#SOLAR CORPUSCULAR RADIATION  
 ...SOLAR ELECTRONS  
 ...SOLAR NEUTRONS  
 ...SOLAR PROTONS

RT M REGION  
 % RADIATION  
 SOLAR PLANETARY INTERACTIONS  
 SUDDEN STORM COMMENCEMENTS  
 SUN

SOLAR COSMIC RAYS  
 2901 2902  
 GS EXTRATERRESTRIAL RADIATION  
 .PRIMARY COSMIC RAYS  
 .#SOLAR COSMIC RAYS  
 .SOLAR RADIATION  
 .#SOLAR COSMIC RAYS  
 IONIZING RADIATION

.COSMIC RAYS  
 ..PRIMARY COSMIC RAYS  
 ..#SOLAR COSMIC RAYS  
 PARTICLES  
 .CORPUSCULAR RADIATION  
 .PRIMARY COSMIC RAYS  
 ..#SOLAR COSMIC RAYS  
 ELECTRON ACCELERATION  
 ENERGETIC PARTICLES  
 GRIST (TELESCOPE)  
 SUN

RT SOLAR CYCLES  
 2902 3001  
 GS CYCLES  
 #SOLAR CYCLES  
 ..SUNSPOT CYCLE  
 INTERNATIONAL QUIET SUN YEAR  
 IRIS SATELLITES  
 SECULAR VARIATIONS  
 SUN  
 SUNSPOTS  
 TWENTY-SEVEN DAY VARIATION  
 SUN

SOLAR DIAMETER  
 1307 3001  
 RT ASTROMETRY  
 % SCIENCE  
 SOLAR ECLIPSES

SOLAR DISK  
 USE SUN

SOLAR DYNAMIC POWER SYSTEMS  
 0301  
 GS ELECTRIC GENERATORS  
 .SOLAR GENERATORS  
 .#SOLAR DYNAMIC POWER SYSTEMS  
 ELECTRIC POWER SUPPLIES  
 #SOLAR DYNAMIC POWER SYSTEMS  
 BRAYTON CYCLE  
 HEAT STORAGE  
 PHOTOTHERMAL CONVERSION  
 RANKINE CYCLE  
 SOLAR COLLECTORS  
 SOLAR ENERGY CONVERSION  
 SOLAR THERMAL ELECTRIC POWER PLANTS  
 SPACE STATION POWER SUPPLIES  
 SPACECRAFT POWER SUPPLIES  
 STIRLING CYCLE

SOLAR DYNAMICS  
 USE HELIOSEISMOLOGY

SOLAR ECLIPSES

3001 3002  
 GS ECLIPSES  
 #SOLAR ECLIPSES  
 OCCULTATION  
 .LUNAR OCCULTATION  
 .#SOLAR ECLIPSES  
 LUNAR SHADOW  
 SOLAR DIAMETER  
 SUN

RT SOLAR ELECTRIC PROPULSION  
 0301  
 GS PROPULSION  
 .ELECTRIC PROPULSION  
 .#SOLAR ELECTRIC PROPULSION  
 .LOW THRUST PROPULSION  
 .SOLAR PROPULSION  
 ..SOLAR ELECTRIC PROPULSION  
 .SPACECRAFT PROPULSION  
 .SOLAR PROPULSION  
 ..SOLAR ELECTRIC PROPULSION  
 SOLAR POWERED AIRCRAFT  
 SOLAR THERMAL PROPULSION  
 SPACE STATION PROPULSION  
 SUN

RT SOLAR ELECTRONS  
 3002  
 GS EXTRATERRESTRIAL RADIATION  
 .SOLAR RADIATION  
 .SOLAR CORPUSCULAR RADIATION  
 ..SOLAR ELECTRONS  
 PARTICLES  
 .CORPUSCULAR RADIATION  
 .SOLAR CORPUSCULAR RADIATION  
 ..SOLAR ELECTRONS

RT SOLAR ENERGY  
 2306  
 RT CIRCUMSOLAR TELESCOPES  
 CLEAN ENERGY  
 % ENERGY  
 ENERGY ABSORPTION FILMS  
 IRIS SATELLITES  
 PHASE CHANGE MATERIALS  
 SOLAR THERMAL ELECTRIC POWER PLANTS  
 SOLETTAS  
 SUN

SOLAR ENERGY ABSORBERS  
 0301  
 RT ABSORBERS (MATERIALS)  
 ELECTROMAGNETIC ABSORPTION  
 PHOTOTHERMAL CONVERSION



[illegible]

|                                 |  |  |  |  |  |
|---------------------------------|--|--|--|--|--|
| RESIDENTIAL ENERGY              |  |  |  |  |  |
| SPACE HEATING (BUILDINGS)       |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| TROMBE WALLS                    |  |  |  |  |  |
| SOLAR INSTRUMENTS               |  |  |  |  |  |
| 0301 1410 1412 2201 3001        |  |  |  |  |  |
| GS #SOLAR INSTRUMENTS           |  |  |  |  |  |
| .SPECTROHELIOGRAPHS             |  |  |  |  |  |
| RT CELESCOPES                   |  |  |  |  |  |
| FILTERGRAMS                     |  |  |  |  |  |
| OPTICAL MEASURING INSTRUMENTS   |  |  |  |  |  |
| RADIATION MEASURING INSTRUMENTS |  |  |  |  |  |
| SOLAR OPTICAL TELESCOPE         |  |  |  |  |  |
| SPECTROMETERS                   |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| TELESCOPES                      |  |  |  |  |  |
| SOLAR INTERIOR                  |  |  |  |  |  |
| 1308 3009                       |  |  |  |  |  |
| GS STELLAR INTERIORS            |  |  |  |  |  |
| #SOLAR INTERIOR                 |  |  |  |  |  |
| RT HELIOSEISMOLOGY              |  |  |  |  |  |
| SOHO MISSION                    |  |  |  |  |  |
| SOLAR ACTIVITY                  |  |  |  |  |  |
| SOLAR CONVECTION (ASTRONOMY)    |  |  |  |  |  |
| SOLAR PHYSICS                   |  |  |  |  |  |
| STELLAR CORES                   |  |  |  |  |  |
| STELLAR STRUCTURE               |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR LASERS                    |  |  |  |  |  |
| USE SOLAR-PUMPED LASERS         |  |  |  |  |  |
| SOLAR LIMB                      |  |  |  |  |  |
| 1308 3001 3002 3008             |  |  |  |  |  |
| RT CORONAL LOOPS                |  |  |  |  |  |
| LIMB BRIGHTENING                |  |  |  |  |  |
| LIMB DARKENING                  |  |  |  |  |  |
| % LIMBS                         |  |  |  |  |  |
| PLANETARY LIMB                  |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR LONGITUDE                 |  |  |  |  |  |
| 2103 3001                       |  |  |  |  |  |
| GS LONGITUDE                    |  |  |  |  |  |
| #SOLAR LONGITUDE                |  |  |  |  |  |
| RT ASTRONOMICAL COORDINATES     |  |  |  |  |  |
| CELESTIAL REFERENCE SYSTEMS     |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR MAGNETIC FIELD            |  |  |  |  |  |
| 2307 3001 3002                  |  |  |  |  |  |
| UF HELIOMAGNETISM               |  |  |  |  |  |
| GS MAGNETIC FIELDS              |  |  |  |  |  |
| .STELLAR MAGNETIC FIELDS        |  |  |  |  |  |
| .#SOLAR MAGNETIC FIELD          |  |  |  |  |  |
| RT ELECTROMAGNETIC FIELDS       |  |  |  |  |  |
| FORCE-FREE MAGNETIC FIELDS      |  |  |  |  |  |
| INTERPLANETARY MAGNETIC FIELDS  |  |  |  |  |  |
| MAGNETIC FIELD RECONNECTION     |  |  |  |  |  |
| SOLAR CONVECTION (ASTRONOMY)    |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR MAXIMUM MISSION           |  |  |  |  |  |
| 3004                            |  |  |  |  |  |
| GS SPACE MISSIONS               |  |  |  |  |  |
| #SOLAR MAXIMUM MISSION          |  |  |  |  |  |
| .#SOLAR MAXIMUM MISSION-A       |  |  |  |  |  |
| RT % FLARES                     |  |  |  |  |  |
| FLUX DENSITY                    |  |  |  |  |  |
| GAMMA RAY SPECTROMETERS         |  |  |  |  |  |
| % MISSIONS                      |  |  |  |  |  |
| MULTIMISSION MODULAR SPACECRAFT |  |  |  |  |  |
| POLARIMETERS                    |  |  |  |  |  |
| PROGRAMS                        |  |  |  |  |  |
| SOLAR FLARES                    |  |  |  |  |  |
| SPACE PROGRAMS                  |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| ULTRAVIOLET SPECTROMETERS       |  |  |  |  |  |
| ULYSSES MISSION                 |  |  |  |  |  |
| SOLAR MAXIMUM MISSION-A         |  |  |  |  |  |
| 3107 3001                       |  |  |  |  |  |
| UF SMM-A                        |  |  |  |  |  |
| GS SPACE MISSIONS               |  |  |  |  |  |
| .SOLAR MAXIMUM MISSION          |  |  |  |  |  |
| .#SOLAR MAXIMUM MISSION-A       |  |  |  |  |  |
| RT % MISSIONS                   |  |  |  |  |  |
| SPACE EXPLORATION               |  |  |  |  |  |
| % SPACECRAFT                    |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR MESOSPHERE EXPLORER       |  |  |  |  |  |
| 1901 3001                       |  |  |  |  |  |
| GS ARTIFICIAL SATELLITES        |  |  |  |  |  |
| .SCIENTIFIC SATELLITES          |  |  |  |  |  |
| .EXPLORER SATELLITES            |  |  |  |  |  |
| .#SOLAR MESOSPHERE EXPLORER     |  |  |  |  |  |
| RT ATMOSPHERIC COMPOSITION      |  |  |  |  |  |
| MESOSPHERE                      |  |  |  |  |  |
| OZONE                           |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR NEBULA                    |  |  |  |  |  |
| USE SOLAR CORONA                |  |  |  |  |  |
| SOLAR NEIGHBORHOOD              |  |  |  |  |  |
| 3001 3002                       |  |  |  |  |  |
| RT ASTRONOMY                    |  |  |  |  |  |
| CELESTIAL BODIES                |  |  |  |  |  |
| LOCAL GROUP (ASTRONOMY)         |  |  |  |  |  |
| MILKY WAY GALAXY                |  |  |  |  |  |
| NEMESIS (STAR)                  |  |  |  |  |  |
| SOLAR SYSTEM                    |  |  |  |  |  |
| STAR CLUSTERS                   |  |  |  |  |  |
| STARS                           |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR NEUTRINOS                 |  |  |  |  |  |
| 3001                            |  |  |  |  |  |
| GS EXTRATERRESTRIAL RADIATION   |  |  |  |  |  |
| .SOLAR RADIATION                |  |  |  |  |  |
| .#SOLAR CORPUSCULAR RADIATION   |  |  |  |  |  |
| .#SOLAR NEUTRINOS               |  |  |  |  |  |
| PARTICLES                       |  |  |  |  |  |
| .ELEMENTARY PARTICLES           |  |  |  |  |  |
| .FERMIONS                       |  |  |  |  |  |
| .#LEPTONS                       |  |  |  |  |  |
| .#NEUTRINOS                     |  |  |  |  |  |
| .#SOLAR NEUTRINOS               |  |  |  |  |  |
| ASTRONOMICAL MODELS             |  |  |  |  |  |
| ASTROPHYSICS                    |  |  |  |  |  |
| NUCLEAR REACTIONS               |  |  |  |  |  |
| STELLAR MODELS                  |  |  |  |  |  |
| SUN                             |  |  |  |  |  |
| SOLAR NEUTRONS                  |  |  |  |  |  |
| 2901 2902                       |  |  |  |  |  |
| GS EXTRATERRESTRIAL RADIATION   |  |  |  |  |  |
| .SOLAR RADIATION                |  |  |  |  |  |
| .#SOLAR CORPUSCULAR RADIATION   |  |  |  |  |  |
| .#SOLAR NEUTRONS                |  |  |  |  |  |
| PARTICLES                       |  |  |  |  |  |
| .CORPUSCULAR RADIATION          |  |  |  |  |  |
| .#SOLAR CORPUSCULAR RADIATION   |  |  |  |  |  |
| .#SOLAR NEUTRONS                |  |  |  |  |  |
| .ELEMENTARY PARTICLES           |  |  |  |  |  |
| .FERMIONS                       |  |  |  |  |  |
| .#NEUTRONS                      |  |  |  |  |  |
| .#SOLAR NEUTRONS                |  |  |  |  |  |
| .NEUTRAL PARTICLES              |  |  |  |  |  |
| .NEUTRONS                       |  |  |  |  |  |
| .#SOLAR NEUTRONS                |  |  |  |  |  |
| NEUTRON FLUX DENSITY            |  |  |  |  |  |
| SOLAR FLARES                    |  |  |  |  |  |
| SOLAR NOISE                     |  |  |  |  |  |
| USE SOLAR RADIO EMISSION        |  |  |  |  |  |
| SOLAR OBLATENESS                |  |  |  |  |  |
| 1308 1901 3001                  |  |  |  |  |  |
| RT OBLATE SPHEROIDS             |  |  |  |  |  |
| SUN                             |  |  |  |  |  |

## NASA THESAURUS HIERARCHICAL UPDATE

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.#SOLAR PROBES
...HELIOS A
...HELIOS B
...HELIOS 1
...HELIOS 2
...STARPROBE SPACECRAFT
...SUNBLAZER SPACE PROBE
...HELIOS PROJECT
PIONEER SPACE PROBES
RT
SUN
ULYSSES MISSION
SOLAR PROMINENCES
2901 2902 2903 3001
UF FILAMENTS (SOLAR PHYSICS)
GS PROMINENCES
.#SOLAR PROMINENCES
STELLAR ACTIVITY
.SOLAR ACTIVITY
.#SOLAR PROMINENCES
RT CHROMOSPHERE
SUN

SOLAR PROPULSION
2802 2808 3303 3501
GS PROPULSION
.LOW THRUST PROPULSION
.#SOLAR PROPULSION
...SOLAR ELECTRIC PROPULSION
...SOLAR THERMAL PROPULSION
.SPACECRAFT PROPULSION
.#SOLAR PROPULSION
...SOLAR ELECTRIC PROPULSION
...SOLAR THERMAL PROPULSION
RT SOLAR POWERED AIRCRAFT
SUN

SOLAR PROTONS
2403 2902
GS EXTRATERRESTRIAL RADIATION
.SOLAR RADIATION
...SOLAR CORPUSCULAR RADIATION
PARTICLES
.CHARGED PARTICLES
...PROTONS
.#SOLAR PROTONS
.CORPUSCULAR RADIATION
.SOLAR CORPUSCULAR RADIATION
.#SOLAR PROTONS
.ELEMENTARY PARTICLES
...FERMIONS
...PROTONS
...#SOLAR PROTONS
BARYONS
RT

SOLAR RADAR ECHOES
0705 0710 3001
GS ECHOES
.RADAR ECHOES
.#SOLAR RADAR ECHOES
RT SUN

SOLAR RADIATION
2402 2902
GS EXTRATERRESTRIAL RADIATION
.#SOLAR RADIATION
...CIRCUMSOLAR RADIATION
...SOLAR CORPUSCULAR RADIATION
...SOLAR ELECTRONS
...SOLAR NEUTRONS
...SOLAR NEUTRONS
...SOLAR PROTONS
...SOLAR COSMIC RAYS
...SOLAR RADIO EMISSION
...SOLAR RADIO BURSTS
...TYPE 2 BURSTS
...TYPE 3 BURSTS
...TYPE 4 BURSTS
...TYPE 5 BURSTS
...SOLAR WIND
...SOLAR X-RAYS
...SUNLIGHT
RT AEROSPACE ENVIRONMENTS
ALBEDO
ATMOSPHERIC REFRACTION
CIRCUMSOLAR TELESCOPES
CLIMATOLOGY
CLOUD COVER
CORPUSCULAR RADIATION
COSMIC NOISE
COSMIC RAYS
DAYGLOW
ELECTROMAGNETIC RADIATION
EXTREME ULTRAVIOLET RADIATION
GENSCHEIN
INFRARED RADIATION
INSOLATION
IONIZING RADIATION
IRIS SATELLITES
LIGHT (VISIBLE RADIATION)
LONG WAVE RADIATION
LONGITUDINAL WAVES
% RADIATION
RADIATION BELTS
RADIATION PRESSURE
RADIATIVE TRANSFER
RADIO WAVES
RECTENNAS

SOLAR RADIATION SHIELDING
0504 0507 0508 3305
GS PROTECTION
.RADIATION PROTECTION
...RADIATION SHIELDING
...#SOLAR RADIATION SHIELDING
SHIELDING
.RADIATION SHIELDING
.#SOLAR RADIATION SHIELDING
RT % RADIATION
SATELLITE TEMPERATURE
SPACECRAFT SHIELDING
SUN

SOLAR RADIATION 1 SATELLITE
2902 3107
GS ARTIFICIAL SATELLITES
#SOLAR RADIATION 1 SATELLITE
RT GALACTIC RADIATION
% RADIATION
SUN

SOLAR RADIATION 3 SATELLITE
2902 3107
GS ARTIFICIAL SATELLITES
#SOLAR RADIATION 3 SATELLITE
RT GALACTIC RADIATION
% RADIATION
SUN

SOLAR RADIO BURSTS
0705 2402 2902
GS BURSTS
.RADIO BURSTS
.#SOLAR RADIO BURSTS
...TYPE 2 BURSTS
...TYPE 3 BURSTS
...TYPE 4 BURSTS
...TYPE 5 BURSTS
ELECTROMAGNETIC RADIATION
.RADIO WAVES
...EXTRATERRESTRIAL RADIO WAVES
...RADIO BURSTS
...#SOLAR RADIO BURSTS
...TYPE 2 BURSTS
...TYPE 3 BURSTS
...TYPE 4 BURSTS

SKY BRIGHTNESS
SOLAR-PUMPED LASERS
STELLAR RADIATION
SUN
THERMAL RADIATION
ULTRAVIOLET RADIATION
ZODIACAL LIGHT

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.....TYPE 5 BURSTS
...SOLAR RADIO EMISSION
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
...RADIO EMISSION
...#RADIO BURSTS
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
...SOLAR RADIO EMISSION
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
EMISSION
.RADIO EMISSION
...RADIO BURSTS
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
...SOLAR RADIO EMISSION
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
EXTRATERRESTRIAL RADIATION
EXTRATERRESTRIAL RADIO
...RADIO BURSTS
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
...SOLAR RADIO EMISSION
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS
...SOLAR RADIO EMISSION
...#SOLAR RADIO BURSTS
.....TYPE 2 BURSTS
.....TYPE 3 BURSTS
.....TYPE 4 BURSTS
.....TYPE 5 BURSTS

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1323

SOLAR GENERATORS  
SUN

SOLAR SEISMOLOGY  
USE HELIOSEISMOLOGY

SOLAR SELECTIVE COATINGS  
USE SELECTIVE SURFACES

SOLAR SENSORS  
1409 1412 2102 2104 3001  
UF SUN SENSORS  
RT ATTITUDE CONTROL  
GUIDANCE SENSORS  
IRIS SATELLITES  
NAVIGATION AIDS  
NAVIGATION INSTRUMENTS  
STAR TRACKERS  
SUN  
TRACKING (POSITION)

SOLAR SIMULATION  
1107 1108 3009  
GS SIMULATION  
#SOLAR SIMULATION  
RT SPACE ENVIRONMENT SIMULATION  
SUN  
THERMAL SIMULATION

SOLAR SIMULATORS  
1107 1108 3009  
GS SIMULATORS  
.ENVIRONMENT SIMULATORS  
.#SOLAR SIMULATORS  
RT SPACE SIMULATORS  
SUN  
TEST FACILITIES

SOLAR SPECTRA  
1411 2902  
GS SPECTRA  
.RADIATION SPECTRA  
..ELECTROMAGNETIC SPECTRA  
...STELLAR SPECTRA  
...#SOLAR SPECTRA  
RT ABSORPTION SPECTRA  
ASTRONOMICAL SPECTROSCOPY  
CONTINUOUS SPECTRA  
CORONAS  
D LINES  
EMISSION SPECTRA  
FILTERGRAMS  
FRAUNHOFER LINES  
H ALPHA LINE  
H BETA LINE

H GAMMA LINE  
H LINES  
INFRARED SPECTRA  
LINE SPECTRA  
LYMAN SPECTRA  
MOLECULAR SPECTRA  
OXYGEN SPECTRA  
SUN  
ULTRAVIOLET SPECTRA  
VISIBLE SPECTRUM  
X RAY SPECTRA

SOLAR SPECTROMETERS  
1411 2902  
GS MEASURING INSTRUMENTS  
.RADIATION MEASURING INSTRUMENTS  
..ACTINOMETERS  
..#SOLAR SPECTROMETERS  
.SPECTROMETERS  
.#SOLAR SPECTROMETERS  
RT ABSORPTION SPECTRA  
EMISSION SPECTRA  
FILTER WHEEL INFRARED SPECTROMETERS  
INFRARED SPECTROMETERS  
SPECTROHELIOGRAPHS  
SUN  
ULTRAVIOLET SPECTROMETERS

SOLAR STORMS  
2902 3001  
GS STELLAR ACTIVITY  
.SOLAR ACTIVITY  
.SOLAR STORMS  
STORMS  
#SOLAR STORMS  
RT FORBUSH DECREASES  
IONOSPHERIC STORMS  
MAGNETIC STORMS  
NOISE STORMS  
SUN

SOLAR STREAMS  
USE SOLAR CORPUSCULAR RADIATION

SOLAR SYSTEM  
3001 3002 3003 3008  
GS CELESTIAL BODIES  
#SOLAR SYSTEM  
PLANETARY SYSTEMS  
#SOLAR SYSTEM  
RT AMALTHEA  
AMOR ASTEROID  
APOLLO ASTEROIDS  
AREND-ROLAND COMET  
ASTEROID BELTS

ASTEROID CAPTURE  
ASTEROIDS  
BRORSEN-METCALF COMET  
CELESTIAL MECHANICS  
CHARON  
CHIRON  
COMET HEADS  
COMET NUCLEI  
COMET TAILS  
COMETS  
EARTH-MOON SYSTEM  
GAS GIANT PLANETS  
GIACOBINI-ZINNER COMET  
GRIGG-SKJELLERUP COMET  
HALLEY'S COMET  
HUMASON COMET  
IRAS-ARAKI-ALCOCK COMET  
JUPITER SATELLITES  
KOHOUTEK COMET  
MERCURY SURFACE  
METEORIDS  
MOREHOUSE COMET  
MRKOS COMET  
NATURAL SATELLITES  
OORT CLOUD  
PLANETARY GEOLOGY  
PLANETS  
PROTOPLANETS  
RHEA (ASTRONOMY)  
SATURN RINGS  
SCHWASSMANN-WACHMANN COMET  
SOLAR NEIGHBORHOOD  
SOLAR SYSTEM EVOLUTION  
SUN  
% SYSTEMS  
TEMPEL 2 COMET  
TERRESTRIAL PLANETS  
TORO ASTEROID  
VENUS SURFACE  
VESTA ASTEROID  
VOYAGER 1977 MISSION  
WEST COMET

SOLAR SYSTEM EVOLUTION  
3002 3003  
GS EVOLUTION (DEVELOPMENT)  
#SOLAR SYSTEM EVOLUTION  
RT LUNAR EVOLUTION  
PLANETARY EVOLUTION  
PLANETARY SYSTEMS  
PLANETS  
SOLAR SYSTEM  
STELLAR EVOLUTION  
SUN

[illegible]

|                                        |                        |                  |                                          |
|----------------------------------------|------------------------|------------------|------------------------------------------|
| SOLDERED JOINTS                        | RT                     | ACTUATORS        | SOLID LUBRICANTS                         |
| 1507 3202                              |                        | ELECTRIC RELAYS  | 1503                                     |
| GS JOINTS (JUNCTIONS)                  |                        | ELECTROMAGNETS   | SN (EXCLUDES SEMISOLIDS SUCH AS GREASES) |
| .METAL JOINTS                          |                        | MAGNET COILS     | GS LUBRICANTS                            |
| .#SOLDERED JOINTS                      |                        | SOLENOID VALVES  | #SOLID LUBRICANTS                        |
| RT BEAM LEADS                          |                        | TOROIDAL PLASMAS | RT BINDERS (MATERIALS)                   |
| BONDED JOINTS                          | SOLETTAS               |                  | GAS LUBRICANTS                           |
| BUTT JOINTS                            | 3109                   |                  | GRAPHITE                                 |
| LAP JOINTS                             | GS MIRRORS             |                  | SELF LUBRICATING MATERIALS               |
| SOLDERING                              | #SOLETTAS              |                  |                                          |
|                                        | REFLECTORS             |                  |                                          |
| SOLDERING                              | -SOLAR REFLECTORS      |                  | SOLID MECHANICS                          |
| 0902 1507 1704 3303                    | .#SOLETTAS             |                  | 2308                                     |
| GS #SOLDERING                          | RT % PLATFORMS         |                  | RT CONTINUUM MECHANICS                   |
| .ULTRASONIC SOLDERING                  | SOLAR ENERGY           |                  | FINITE ELEMENT METHOD                    |
| RT BONDING                             | % SPACECRAFT           |                  | MECHANICAL PROPERTIES                    |
| BRAZING                                |                        |                  | % MECHANICS (PHYSICS)                    |
| FLUXES                                 |                        |                  | % SCIENCE                                |
| HEAT AFFECTED ZONE                     | SOLID ARGON            |                  | % SOLIDS                                 |
| % JOINING                              | USE SOLIDIFIED GASES   |                  | STRUCTURAL ANALYSIS                      |
| LASER WELDING                          |                        |                  |                                          |
| LOW TEMPERATURE BRAZING                | SOLID CRYOGEN COOLING  |                  |                                          |
| METAL BONDING                          | 1202                   |                  | SOLID NITROGEN                           |
| METAL-METAL BONDING                    | GS COOLING             |                  | 0603 1807 2603 2809                      |
| SEALING                                | #SOLID CRYOGEN COOLING |                  | GS CHEMICAL ELEMENTS                     |
| SOLDERED JOINTS                        | RT CRYOGENIC FLUIDS    |                  | .NITROGEN                                |
| SOLDERS                                | CRYOGENICS             |                  | .#SOLID NITROGEN                         |
| WELDING                                | LIQUEFIED GASES        |                  | GASES                                    |
|                                        |                        |                  | .NITROGEN                                |
| SOLDERS                                | SOLID CRYOGENS         |                  | .#SOLID NITROGEN                         |
| 1507 1704 1701                         | 1202                   |                  | .SOLIDIFIED GASES                        |
| GS ALLOYS                              | GS GASES               |                  | .SOLID CRYOGENS                          |
| #SOLDERS                               | .SOLIDIFIED GASES      |                  | .#SOLID NITROGEN                         |
| RT LEAD ALLOYS                         | .#SOLID CRYOGENS       |                  | SOLIDS                                   |
| SEALERS                                | ...SOLID NITROGEN      |                  | .SOLIDIFIED GASES                        |
| SOLDERING                              | SOLIDS                 |                  | .SOLID CRYOGENS                          |
| TIN ALLOYS                             | .SOLIDIFIED GASES      |                  | .#SOLID NITROGEN                         |
| ZINC ALLOYS                            | .#SOLID CRYOGENS       |                  | CRYOGENICS                               |
|                                        | ...SOLID NITROGEN      |                  | REFRIGERANTS                             |
| SOLENOID VALVES                        | RT COOLING SYSTEMS     |                  |                                          |
| 0904 1202 2304                         | CRYOGENIC EQUIPMENT    |                  | SOLID PHASES                             |
| GS VALVES                              | CRYOGENICS             |                  | 2603                                     |
| #SOLENOID VALVES                       | LIQUID NITROGEN        |                  | RT EUTECTICS                             |
| RT AUTOMATIC CONTROL VALVES            |                        |                  | GAS-METAL INTERACTIONS                   |
| ELECTRIC CONTROL                       | SOLID ELECTRODES       |                  | GAS-SOLID INTERFACES                     |
| % ELECTRIC EQUIPMENT                   | 0704                   |                  | LIQUID PHASES                            |
| ELECTRIC RELAYS                        | GS ELECTRODES          |                  | LIQUID-SOLID INTERFACES                  |
| ELECTRIC SWITCHES                      | #SOLID ELECTRODES      |                  | LIQUIDUS                                 |
| HYDRAULIC CONTROL                      | RT TRANSDUCANCE        |                  | METALLIC HYDROGEN                        |
| OFF-ON CONTROL                         |                        |                  | PHASE DIAGRAMS                           |
| SOLENOIDS                              | SOLID ELECTROLYTES     |                  | PHASE SEPARATION (MATERIALS)             |
|                                        | 1703                   |                  | % PHASES                                 |
| SOLENOIDS                              | GS CONDUCTORS          |                  | SOLIDIFIED GASES                         |
| 0905 2307 2604                         | .ELECTROLYTES          |                  | SOLIDUS                                  |
| SN (EXCLUDES METEOROLOGICAL SOLENOIDS) | .#SOLID ELECTROLYTES   |                  | SYNTECTIC ALLOYS                         |



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|                                 |                                   |     |                 |                               |
|---------------------------------|-----------------------------------|-----|-----------------|-------------------------------|
| SOLID PROPELLANT COMBUSTION     |                                   | ... | X-248 ENGINE    | LOKI ROCKET VEHICLE           |
| 2702                            |                                   | ... | X-254 ENGINE    | MACE MISSILES                 |
| GS                              |                                   | ... | X-258 ENGINES   | MATRA MISSILE                 |
|                                 | COMBUSTION                        | ... | X-258-B1 ENGINE | MAULER MISSILE                |
|                                 | .PROPELLANT COMBUSTION            | ... | X-259 ENGINE    | METEOR 1 ROCKET VEHICLE       |
|                                 | .#SOLID PROPELLANT COMBUSTION     | ... | XM-33 ENGINE    | MINUTEMAN ICBM                |
|                                 | ...                               | ... | XM-33 ENGINE    | NIKE-AJAX MISSILE             |
| RT                              | BURNING RATE                      | ... | XM-33 ENGINE    | NIKE-APACHE ROCKET VEHICLE    |
|                                 | COMBUSTION STABILITY              | ... | XM-33 ENGINE    | NIKE-CAJUN ROCKET VEHICLE     |
|                                 | EROSIVE BURNING                   | ... | XM-33 ENGINE    | NIKE-HERCULES MISSILE         |
|                                 | FUEL COMBUSTION                   | ... | XM-33 ENGINE    | NIKE-JAVELIN ROCKET VEHICLE   |
|                                 | HEAT GENERATION                   | ... | XM-33 ENGINE    | NIKE-TOMAHAWK ROCKET VEHICLE  |
|                                 | METAL COMBUSTION                  | ... | XM-33 ENGINE    | NIKE-ZEUS MISSILE             |
|                                 | PROPELLANT CHEMISTRY              | ... | XM-33 ENGINE    | PERSHING MISSILE              |
|                                 |                                   | ... | XM-33 ENGINE    | PHOENIX SOUNDING ROCKET       |
| SOLID PROPELLANT IGNITION       |                                   | ... | XM-33 ENGINE    | POLARIS MISSILES              |
| 2702                            |                                   | ... | XM-33 ENGINE    | RAM B LAUNCH VEHICLE          |
| GS                              |                                   | ... | XM-33 ENGINE    | REDEYE MISSILE                |
|                                 | COMBUSTION                        | ... | XM-33 ENGINE    | REGULUS MISSILE               |
|                                 | .PROPELLANT COMBUSTION            | ... | XM-33 ENGINE    | RESTARTABLE ROCKET ENGINES    |
|                                 | ...                               | ... | XM-33 ENGINE    | RETROCKET ENGINES             |
|                                 | ..SOLID PROPELLANT COMBUSTION     | ... | XM-33 ENGINE    | RUBIS ROCKET VEHICLE          |
|                                 | ..#SOLID PROPELLANT IGNITION      | ... | XM-33 ENGINE    | SCOUT LAUNCH VEHICLE          |
|                                 | IGNITION                          | ... | XM-33 ENGINE    | SERGEANT MISSILES             |
|                                 | #SOLID PROPELLANT IGNITION        | ... | XM-33 ENGINE    | SHRIKE MISSILE                |
| RT                              | HYBRID PROPELLANTS                | ... | XM-33 ENGINE    | SKUA ROCKET VEHICLES          |
|                                 | HYPERGOLIC ROCKET PROPELLANTS     | ... | XM-33 ENGINE    | SKYBOLT MISSILE               |
|                                 | IGNITERS                          | ... | XM-33 ENGINE    | SKYLARK ROCKET VEHICLE        |
|                                 | IGNITION TEMPERATURE              | ... | XM-33 ENGINE    | SPACE SHUTTLE UPPER STAGE D   |
|                                 | INHIBITORS                        | ... | XM-33 ENGINE    | SPARROW MISSILES              |
|                                 | METAL COMBUSTION                  | ... | XM-33 ENGINE    | SPRINT MISSILE                |
|                                 | PYROPHORIC MATERIALS              | ... | XM-33 ENGINE    | SS-11 MISSILE                 |
|                                 | SQUIBS                            | ... | XM-33 ENGINE    | SUNBLAZER SPACE PROBE         |
| SOLID PROPELLANT ROCKET ENGINES |                                   | ... | XM-33 ENGINE    | SUSTAINER ROCKET ENGINES      |
| 2702                            |                                   | ... | XM-33 ENGINE    | TALOS MISSILE                 |
| GS                              |                                   | ... | XM-33 ENGINE    | TARTAR MISSILE                |
|                                 | ROCKET ENGINES                    | ... | XM-33 ENGINE    | TERRIER MISSILE               |
|                                 | .#SOLID PROPELLANT ROCKET ENGINES | ... | XM-33 ENGINE    | THOR ABLE ROCKET VEHICLE      |
|                                 | ...                               | ... | XM-33 ENGINE    | THOR DELTA LAUNCH VEHICLE     |
|                                 | ...APOGEE BOOST MOTORS            | ... | XM-33 ENGINE    | THOR LAUNCH VEHICLES          |
|                                 | ...ASROC ENGINE                   | ... | XM-33 ENGINE    | TITAN LAUNCH VEHICLES         |
|                                 | ...HERCULES ENGINE                | ... | XM-33 ENGINE    | TRAILBLAZER 1 REENTRY VEHICLE |
|                                 | ...M-46 ENGINE                    | ... | XM-33 ENGINE    | TRAILBLAZER 2 REENTRY VEHICLE |
|                                 | ...M-55 ENGINE                    | ... | XM-33 ENGINE    | ULLAGE ROCKET ENGINES         |
|                                 | ...M-56 ENGINE                    | ... | XM-33 ENGINE    | VANGUARD 2 LAUNCH VEHICLE     |
|                                 | ...M-57 ENGINE                    | ... | XM-33 ENGINE    | VERNIER ENGINES               |
|                                 | ...NIKE BOOSTER ROCKET ENGINES    | ... | XM-33 ENGINE    | WASP SOUNDING ROCKET          |
|                                 | ...P-1 ENGINE                     | ... | XM-33 ENGINE    | X-17 REENTRY VEHICLE          |
|                                 | ...SL-3 ROCKET ENGINE             | ... | XM-33 ENGINE    | ZUNI ROCKET VEHICLE           |
|                                 | ...SPACE SHUTTLE BOOSTERS         | ... | XM-33 ENGINE    |                               |
|                                 | ...ADVANCED SOLID ROCKET MOTOR    | ... | XM-33 ENGINE    |                               |
|                                 | (STS)                             | ... | XM-33 ENGINE    |                               |
|                                 | ...SYNCOM APOGEE ENGINES          | ... | XM-33 ENGINE    |                               |
|                                 | ...TU-121 ENGINE                  | ... | XM-33 ENGINE    |                               |
|                                 | ...TX-77 ENGINE                   | ... | XM-33 ENGINE    |                               |
|                                 | ...TX-354 ENGINE                  | ... | XM-33 ENGINE    |                               |

..CASE BONDED PROPELLANTS  
 ..COMPOSITE PROPELLANTS  
 ..NITRAMINE PROPELLANTS  
 ..PLASTIC PROPELLANTS  
 ..SOLID ROCKET PROPELLANTS  
 ..DOUBLE BASE ROCKET PROPELLANTS  
 ...HMX  
 ...HTPB PROPELLANTS  
 ...METAL PROPELLANTS  
 AIRCRAFT FUELS  
 CHEMICAL FUELS  
 COLLOIDAL PROPELLANTS  
 GELLED PROPELLANTS  
 HIGH TEMPERATURE PROPELLANTS  
 HYBRID PROPELLANTS  
 INHIBITORS  
 METAL FUELS  
 NITROGUANIDINE  
 PLASTICIZERS  
 PROPELLANT BINDERS  
 PROPELLANT GRAINS  
 RDX  
 ROCKET PROPELLANTS  
 STORABLE PROPELLANTS  
  
 SOLID ROCKET BINDERS  
 1808 2702 2804 2809  
 GS ADDITIVES  
 .PROPELLANT ADDITIVES  
 ..PROPELLANT BINDERS  
 ..#SOLID ROCKET BINDERS  
 BINDERS (MATERIALS)  
 .PROPELLANT BINDERS  
 .#SOLID ROCKET BINDERS  
 GLYCIDYL AZIDE POLYMER  
 PLASTICIZERS  
  
 RT  
  
 SOLID ROCKET BOOSTERS (SPACE SHUTTLE)  
 USE SPACE SHUTTLE BOOSTERS  
  
 SOLID ROCKET PROPELLANTS  
 2702 2809  
 GS PROPELLANTS  
 .ROCKET PROPELLANTS  
 .#SOLID ROCKET PROPELLANTS  
 ...DOUBLE BASE ROCKET PROPELLANTS  
 ...METAL PROPELLANTS  
 .SOLID PROPELLANTS  
 .#SOLID ROCKET PROPELLANTS  
 ...DOUBLE BASE ROCKET PROPELLANTS  
 ...HMX  
 ...HTPB PROPELLANTS  
 ...METAL PROPELLANTS  
 AMMONIUM PERCHLORATES  
 BURNING RATE  
  
 RT

CASE BONDED PROPELLANTS  
 COMPOSITE PROPELLANTS  
 DOMING PROPELLANTS  
 GELLED ROCKET PROPELLANTS  
 HYBRID ROCKET PROPELLANTS  
 LIQUID ROCKET PROPELLANTS  
 MONOPROPELLANTS  
 POTASSIUM PERCHLORATES  
 PROPELLANT GRAINS  
 RDX  
 ROCKET ENGINES  
 SLURRY PROPELLANTS  
  
 SOLID ROTATION  
 USE ROTATING BODIES  
  
 SOLID SOLUTIONS  
 O603 2603  
 GS MIXTURES  
 .SOLUTIONS  
 .#SOLID SOLUTIONS  
 AGING (METALLURGY)  
 RT ALLOYING  
 ALLOYS  
 LIQUID PHASES  
 LIQUIDUS  
 MELTING POINTS  
 ORDER-DISORDER TRANSFORMATIONS  
 PHASE DIAGRAMS  
 PRECIPITATION HARDENING  
 SOLIDS  
 SUPERSATURATION  
 TERNARY SYSTEMS  
  
 SOLID STATE  
 O603 2603  
 RT CRYSTALLIZATION  
 ENERGY GAPS (SOLID STATE)  
 MELTING POINTS  
 METALLIC HYDROGEN  
 SOLIDS  
  
 SOLID STATE DEVICES  
 O906 1601 2603  
 GS ELECTRONIC EQUIPMENT  
 #SOLID STATE DEVICES  
 ..CRYOTRONS  
 ..CRYSTAL RECTIFIERS  
 ..METAL-NITRIDE-OXIDE-SEMICONDUCTOR  
  
 ..MULTISPECTRAL LINEAR ARRAYS  
 ..SEMICONDUCTOR DEVICES  
 ...AVALANCHE DIODES  
 ....CRYOSAR  
 ...BARRITT DIODES

...CHARGE TRANSFER DEVICES  
 ...BUCKET BRIGADE DEVICES  
 ...CHARGE COUPLED DEVICES  
 ...CHARGE INJECTION DEVICES  
 ...GERMANIUM DIODES  
 ...HETEROJUNCTION DEVICES  
 ...HIGH ELECTRON MOBILITY TRANSISTORS  
 .....MODFETS  
 ...JUNCTION DIODES  
 ...MIM DIODES  
 ...STEP RECOVERY DIODES  
 ...LIGHT EMITTING DIODES  
 ...METAL OXIDE SEMICONDUCTORS  
 ....CMOS  
 ....ITO (SEMICONDUCTORS)  
 ....SOS (SEMICONDUCTORS)  
 ...MIM (SEMICONDUCTORS)  
 ...MIS (SEMICONDUCTORS)  
 ...MSM (SEMICONDUCTORS)  
 ...NDM SEMICONDUCTOR DEVICES  
 ...NEURISTORS  
 ...PARAMETRIC DIODES  
 ...PHOTODIODES  
 ...PHOTOVOLTAIC CELLS  
 ...SOLAR CELLS  
 ...VERTICAL JUNCTION SOLAR CELLS  
 ...SCHOTTKY DIODES  
 ...SEMICONDUCTOR LASERS  
 ...ALUMINUM GALLIUM ARSENIDE LASERS  
 ...GALLIUM ARSENIDE LASERS  
 ...QUANTUM WELL LASERS  
 ...SOI (SEMICONDUCTORS)  
 ...THERMISTORS  
 ...THYRISTORS  
 ...SILICON CONTROLLED RECTIFIERS  
 ...TRANSFERRED ELECTRON DEVICES  
 ...TRANSISTOR AMPLIFIERS  
 ...TRANSISTORS  
 ...BIPOLAR TRANSISTORS  
 ...FIELD EFFECT TRANSISTORS  
 ...CHARGE FLOW DEVICES  
 .....JFET  
 .....MODFETS  
 ...HIGH ELECTRON MOBILITY TRANSISTORS  
 .....MODFETS  
 .....JUNCTION TRANSISTORS  
 .....JFET  
 ...PHOTOTRANSISTORS  
 ...SILICON TRANSISTORS  
 ...SOS (SEMICONDUCTORS)  
 ...TRAPATT DEVICES  
 ...VARACTOR DIODES

[illegible]

RT ...SOLID NITROGEN  
CRYOGENIC FLUIDS  
CRYOGENIC TEMPERATURE  
CRYOGENICS  
FREEZING  
LOW TEMPERATURE PHYSICS  
MELTING POINTS  
METALLIC HYDROGEN  
SOLID PHASES  
SOLIDIFICATION

SOLIDS  
O603 2603  
GS #SOLIDS  
.SOLIDIFIED GASES  
..SOLID CRYOGENS  
...SOLID NITROGEN  
RT % BODIES  
% FLUIDS  
% MATERIALS  
METALLIC HYDROGEN  
ORGANIC SOLIDS  
PHASE TRANSFORMATIONS  
SOLID MECHANICS  
SOLID SOLUTIONS  
SOLID STATE  
THERMOCHROMATIC MATERIALS  
VAPOR PHASES

SOLIDS FLOW  
1203 3501  
GS FLUID FLOW  
#SOLIDS FLOW  
RT % FLOW  
FLOW MEASUREMENT  
FLOW THEORY  
MASS FLOW  
MULTIPHASE FLOW  
PARTICLE SIZE DISTRIBUTION  
STEADY FLOW  
TWO PHASE FLOW  
UNIFORM FLOW  
UNSTEADY FLOW

SOLIDUS  
1701 3304  
RT BINARY SYSTEMS (MATERIALS)  
LIQUID PHASES  
LIQUIDUS  
SOLID PHASES

SOLIONS  
O604 0902 1406 2301  
RT CIRCUITS  
DIODES

INTEGRATORS  
ION CURRENTS

SOLITARY WAVES  
0710 2301 2304 2309 2311 2402  
UF SOLITONS  
GS TRAVELING WAVES  
#SOLITARY WAVES  
RT BACKWARD WAVES  
CNIDAL WAVES  
ELASTIC WAVES  
ELECTROMAGNETIC RADIATION  
PLANE WAVES  
PULSES  
RADIO WAVES  
RATES (PER TIME)  
VELOCITY

SOLITHANES  
1808 1809 1810  
RT ELASTOMERS  
% POLYMERS  
SYNTHETIC RUBBERS

SOLITONS  
USE SOLITARY WAVES

SOLOMON COMPUTERS  
0801 0802  
GS DATA PROCESSING EQUIPMENT  
.COMPUTERS  
..DIGITAL COMPUTERS  
..#SOLOMON COMPUTERS

SOLRAD 10 SATELLITE  
USE EXPLORER 44 SATELLITE

SOLSTICES  
1904 2001 3001 3002  
RT EQUINOXES  
SEASONS  
SOLAR POSITION  
SUMMER  
WINTER

SOLUBILITY  
0601 0603  
UF IMMISCIBILITY  
MISCIBILITY  
RT CLARITY  
CONCENTRATION (COMPOSITION)  
DIFFUSIVITY  
DISSOLVED GASES  
DISSOLVING  
GAS-SOLID INTERFACES

HENRY LAW  
HYGROSCOPICITY  
INCOMPATIBILITY  
LIQUID PHASES  
LIQUID-GAS MIXTURES  
LIQUID-LIQUID INTERFACES  
LIQUID-VAPOR INTERFACES  
MISCIBILITY GAP  
MIXTURES  
PHASE DIAGRAMS  
PHASE SEPARATION (MATERIALS)  
PRECIPITATION (CHEMISTRY)  
SOLUTIONS  
SUPERCRITICAL FLUIDS  
THERMODYNAMIC PROPERTIES  
THIXOTROPY  
TURBIDITY  
VISCOSITY

SOLUTES  
O603  
RT DISSOLVING  
SOLUTIONS

% SOLUTION  
3407  
SN

(USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT DISSOLVING  
PROBLEM SOLVING  
SOLUTIONS

SOLUTIONS  
O602  
GS

MIXTURES  
#SOLUTIONS  
..AQUEOUS SOLUTIONS  
..GAS MIXTURES  
...AIR  
...ALVEOLAR AIR  
...COMPRESSED AIR  
...EXPIRED AIR  
...HIGH TEMPERATURE AIR  
...LIQUID AIR  
...DETONABLE GAS MIXTURES  
...PHOTOGRAPHIC EMULSIONS  
...NUCLEAR EMULSIONS  
..SOLID SOLUTIONS  
AZEOTROPES  
COMPOSITION (PROPERTY)  
DISSOLVED GASES  
EMULSIONS  
EUTECTICS  
HENRY LAW

RT  
COMPOSITION (PROPERTY)  
DISSOLVED GASES  
EMULSIONS  
EUTECTICS  
HENRY LAW

SOUND RANGING  
ULTRASONIC WAVE TRANSDUCERS  
UNDERWATER ACOUSTICS  
UNDERWATER COMMUNICATION

SONDES  
0705  
UF  
GS

0710 2003  
METEOROLOGICAL PROBES  
MEASURING INSTRUMENTS  
#SONDES

SOLVOLYSIS  
O602  
GS RECLAMATION  
. MATERIALS RECOVERY  
. #SOLVOLYSIS  
RT RECYCLING  
SOLVENTS

% PROBES  
SOUNDING  
SOUNDING ROCKETS

SONIC ANEMOMETERS  
1203 1406 2 104 3501  
GS  
MEASURING INSTRUMENTS  
. ANEMOMETERS  
.#SONIC ANEMOMETERS  
RT  
ACOUSTICS  
FLOWMETERS  
HOT-FILM ANEMOMETERS  
VELOCITY MEASUREMENT

SONIC BOOMS  
O2O4 1203 2301 3501  
GS ELASTIC WAVES

SOMMERFELD WAVES  
O705 O710 O901  
GS ELECTROMAGNETIC RADIATION  
#SOMMERFELD WAVES  
SURFACE WAVES  
#SOMMERFELD WAVES  
RT DIELECTRIC PROPERTIES  
ELECTRIC CONDUCTORS

SONAR  
1310 2104 2301 3401  
GS #SONAR  
SONOBUOYS  
RT DISTANCE MEASURING EQUIPMENT  
ECHO SOUNDING  
ECHO SUPPRESSORS  
HYDROPHONES  
LOFAR  
NAVIGATION AIDS  
SOUND LOCALIZATION

SONIC FATIGUE  
USE ACOUSTIC FATIGUE

SONIC FLOW  
USE TRANSONIC FLOW

SONIC NOZZLES  
 2806 2808  
 RT ACOUSTIC NOZZLES  
 CONICAL NOZZLES  
 % NOZZLES  
 SUPERSONIC NOZZLES  
 TRANSONIC FLOW  
 TRANSONIC NOZZLES  
  
 SONIC SOLDERING  
 USE ULTRASONIC SOLDERING  
  
 SONIC SPEED  
 USE ACOUSTIC VELOCITY  
  
 SONIC WAVEGUIDES  
 USE ACOUSTIC DELAY LINES  
  
 SONBUOYS  
 0702 0710 2301  
 GS RADIO EQUIPMENT  
 .RADIO TRANSMITTERS  
 .#SONBUOYS  
 SONAR  
 #SONBUOYS  
 TRANSMITTERS  
 .RADIO TRANSMITTERS  
 .#SONBUOYS  
 RT ANTISUBMARINE WARFARE  
 HYDROPHONES  
 UNDERWATER ACOUSTICS  
 UNDERWATER COMMUNICATION  
  
 SONOGRAMS  
 0710 2301  
 RT RECORDING INSTRUMENTS  
 SOUND WAVES  
 WHISTLER RECORDERS  
 WHISTLERS  
  
 SONOHOLOGRAPHY  
 USE ACOUSTICAL HOLOGRAPHY  
  
 SONOLUMINESCENCE  
 0704 2301  
 GS EMISSION  
 .LIGHT EMISSION  
 ..LUMINESCENCE  
 ...#SONOLUMINESCENCE  
  
 S00T  
 0603 3301  
 GS PARTICLES  
 .PARTICULATES  
 .#S00T

RT AIR POLLUTION  
 CARBON  
 COMBUSTION PRODUCTS  
 FIRE DAMAGE  
 SMOKE  
 SMOKE ABATEMENT  
  
 SORBATES  
 0603 1203  
 RT SORBENTS  
 SORPTION  
  
 SORBENTS  
 0603 1203  
 GS #SORBENTS  
 .ABSORBENTS  
 .ADSORBENTS  
 RT SORBATES  
 SORPTION  
  
 SORET COEFFICIENT  
 1203 3303 3304 3501  
 GS COEFFICIENTS  
 .DIFFUSION COEFFICIENT  
 .#SORET COEFFICIENT  
 TRANSPORT PROPERTIES  
 .DIFFUSION COEFFICIENT  
 .#SORET COEFFICIENT  
 RT LIQUID FLOW  
 THERMAL DIFFUSION  
  
 SORGHUM  
 0409  
 GS FARM CROPS  
 .GRAINS (FOOD)  
 .#SORGHUM  
 PLANTS (BOTANY)  
 .GRASSES  
 .#SORGHUM  
 RT AGRICULTURE  
 CROP IDENTIFICATION  
 % CROPS  
 EARTH RESOURCES  
  
 SORPTION  
 0602 0603 1203  
 UF CRYOSORPTION  
 GS #SORPTION  
 .ADSORPTION  
 ..CHEMISORPTION  
 RT % ABSORPTION  
 CHROMATOGRAPHY  
 CONCENTRATING  
 EXTRACTION  
 GAS CHROMATOGRAPHY

LIQUID CHROMATOGRAPHY  
 MATERIAL ABSORPTION  
 PERMEATING  
 % SEPARATION  
 SORBATES  
 SORBENTS  
 SURFACE PROPERTIES  
  
 SORTIE CAN  
 USE SORTIE SYSTEMS  
  
 SORTIE LAB  
 USE SORTIE SYSTEMS  
  
 SORTIE SYSTEMS  
 3110  
 UF SORTIE CAN  
 SORTIE LAB  
 GS PAYLOADS  
 #SORTIE SYSTEMS  
 SPACE LABORATORIES  
 SPACE SHUTTLE PAYLOADS  
 SPACE SHUTTLES  
 SPACE STATIONS  
 SPACELAB PAYLOADS  
  
 SORTING  
 USE CLASSIFYING  
  
 SOS (SEMICONDUCTORS)  
 2602  
 UF SILICON-ON-SAPPHIRE JUNCTIONS  
 SILICON-ON-SAPPHIRE SEMICONDUCTORS  
 SILICON-ON-SAPPHIRE TRANSISTORS  
 ELECTRONIC EQUIPMENT  
 .SOLID STATE DEVICES  
 ..SEMICONDUCTOR DEVICES  
 ...METAL OXIDE SEMICONDUCTORS  
 ...#SOS (SEMICONDUCTORS)  
 ...TRANSISTORS  
 ....SILICON TRANSISTORS  
 ....#SOS (SEMICONDUCTORS)  
 ....SEMICONDUCTORS (MATERIALS)  
 .METAL OXIDE SEMICONDUCTORS  
 .#SOS (SEMICONDUCTORS)  
 ITO (SEMICONDUCTORS)  
 SIS (SEMICONDUCTORS)  
 SOI (SEMICONDUCTORS)  
  
 RT  
  
 SOT  
 USE SOLAR OPTICAL TELESCOPE  
  
 SOUND  
 USE ACOUSTICS

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SOUND ABSORPTION<br>USE SOUND TRANSMISSION                                                                                                                                                                                                             | % GENERATORS<br>HORNS<br>LOUDSPEAKERS<br>NOISE GENERATORS<br>RADIATION SOURCES<br>SIGNAL GENERATORS                                                                                                                                                                                                                                                                         | SOUND PRESSURE<br>2301<br>GS PRESSURE<br>.RADIATION PRESSURE<br>.#SOUND PRESSURE                                                                                                                                                                                                                                   |
| SOUND AMPLIFICATION<br>0702 0710 1002 2301<br>GS AMPLIFICATION<br>#SOUND AMPLIFICATION                                                                                                                                                                 | % SIGNALS<br>SIRENS<br>WARNING SYSTEMS                                                                                                                                                                                                                                                                                                                                      | RT ACOUSTIC MEASUREMENT<br>ACOUSTIC VELOCITY<br>EXPLOSIONS<br>FLUX DENSITY<br>LOUDNESS<br>NOISE (SOUND)<br>SHOCK WAVES<br>STATIC PRESSURE                                                                                                                                                                          |
| RT ACOUSTIC ATTENUATION<br>ACOUSTIC EXCITATION<br>ACOUSTICS                                                                                                                                                                                            | SOUND HOLOGRAPHY<br>USE ACOUSTICAL HOLOGRAPHY                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                    |
| SOUND BARRIER<br>USE ACOUSTIC VELOCITY                                                                                                                                                                                                                 | SOUND INTENSITY<br>0710 2301<br>GS ACOUSTIC PROPERTIES<br>#SOUND INTENSITY<br>...ZERO SOUND<br>RATES (PER TIME)<br>.FLUX DENSITY<br>.#SOUND INTENSITY<br>...ZERO SOUND<br>AUDITORY STIMULI<br>BIOACOUSTICS<br>EFFECTIVE PERCEIVED NOISE LEVELS<br>LOUDNESS<br>NOISE INTENSITY<br>NOISE MEASUREMENT<br>RADIANT FLUX DENSITY<br>SIGNAL FADING<br>SIGNAL FADING RATE<br>SIRENS | SOUND PROPAGATION<br>0710 2301<br>GS #SOUND PROPAGATION<br>.VOICE<br>RT ACOUSTIC PROPAGATION<br>ACOUSTICS<br>ATTENUATION<br>% CONDUCTION<br>DIFFUSION<br>NOISE GENERATORS<br>NOISE PROPAGATION<br>SHOCK WAVE PROPAGATION                                                                                           |
| SOUND DETECTING AND RANGING<br>1301 1409 2602<br>UF ACOUSTIC DETECTION<br>RT ACOUSTIC SCATTERING<br>ATMOSPHERIC TEMPERATURE<br>% INSTRUMENTS<br>MEASURING INSTRUMENTS<br>METEOROLOGICAL INSTRUMENTS<br>METEOROLOGY<br>SODAR<br>TEMPERATURE MEASUREMENT | RT EFFECTIVE PERCEIVED NOISE LEVELS<br>LOUDNESS<br>NOISE INTENSITY<br>NOISE MEASUREMENT<br>RADIANT FLUX DENSITY<br>SIGNAL FADING<br>SIGNAL FADING RATE<br>SIRENS                                                                                                                                                                                                            | SOUND RANGING<br>0710 2301<br>GS RANGEFINDING<br>#SOUND RANGING<br>RT DETECTION<br>DISTANCE MEASURING EQUIPMENT<br>ECHO SOUNDING<br>POSITION (LOCATION)<br>SONAR<br>SOUND FIXING AND RANGING<br>TARGET ACQUISITION<br>TRACKING (POSITION)                                                                          |
| SOUND DETECTORS<br>USE SOUND TRANSDUCERS                                                                                                                                                                                                               | SOUND LOCALIZATION<br>0710 2301<br>GS PERCEPTION<br>#SOUND LOCALIZATION<br>AUDITORY PERCEPTION<br>BEARING (DIRECTION)<br>BINAURAL HEARING<br>DETECTION<br>ECHO SOUNDING<br>% ORIENTATION<br>POSITION INDICATORS<br>RANGE FINDERS<br>SONAR<br>SPACE PERCEPTION<br>TRACKING (POSITION)                                                                                        | SOUND TRANSDUCERS<br>2301<br>UF SOUND DETECTORS<br>GS TRANSDUCERS<br>#SOUND TRANSDUCERS<br>...ELECTROACOUSTIC TRANSDUCERS<br>...HYDROPHONES<br>...LOUDSPEAKERS<br>...MICROPHONES<br>ELECTROACOUSTICS<br>% RADIATORS<br>RT SIGNAL DETECTION<br>SIGNAL DETECTORS<br>UNDERWATER ACOUSTICS<br>UNDERWATER COMMUNICATION |
| SOUND FIELDS<br>0710 2301<br>RT ACOUSTICS<br>FIELD THEORY (PHYSICS)<br>MICROSONICS<br>PROPELLER NOISE                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                    |
| SOUND FIXING AND RANGING<br>2602<br>UF SFAR<br>SOFAR<br>RT SOUND RANGING<br>SOUND TRANSMISSION<br>UNDERWATER ACOUSTICS                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                    |
| SOUND FREQUENCIES<br>USE ACOUSTIC FREQUENCIES                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                    |
| SOUND GENERATORS<br>2301<br>UF ACOUSTIC GENERATORS<br>RT ACOUSTIC NOZZLES<br>AUDIO FREQUENCIES<br>AUDITORY STIMULI<br>BELLS<br>CONTINUOUS NOISE                                                                                                        | SOUND MEASUREMENT<br>USE ACOUSTIC MEASUREMENT                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                    |

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

|                      |                                   |  |  |
|----------------------|-----------------------------------|--|--|
| GS                   | #SOUNDS (TOPOGRAPHIC FEATURES)    |  |  |
|                      | .BLOCK ISLAND SOUND (RI)          |  |  |
|                      | .MCMURDO SOUND                    |  |  |
| RT                   | .PRINCE WILLIAM SOUND (AK)        |  |  |
|                      | .CHESAPEAKE BAY (US)              |  |  |
|                      | INLETS (TOPOGRAPHY)               |  |  |
|                      | OCEANS                            |  |  |
|                      | RIVERS                            |  |  |
|                      | WATER                             |  |  |
| SOURCE PROGRAMS      |                                   |  |  |
| O802                 |                                   |  |  |
| GS                   | COMPUTER PROGRAMS                 |  |  |
|                      | #SOURCE PROGRAMS                  |  |  |
| % SOURCES            |                                   |  |  |
| O303 2201            |                                   |  |  |
| SN                   | (USE OF A MORE SPECIFIC TERM IS   |  |  |
|                      | RECOMMENDED--CONSULT THE TERMS    |  |  |
|                      | LISTED BELOW)                     |  |  |
| RT                   | CAUSES                            |  |  |
|                      | DERIVATION                        |  |  |
|                      | ELECTRON SOURCES                  |  |  |
|                      | EXTRAGALACTIC RADIO SOURCES       |  |  |
|                      | ION SOURCES                       |  |  |
|                      | NONPOINT SOURCES                  |  |  |
|                      | RADIATION SOURCES                 |  |  |
|                      | RADIO SOURCES (ASTRONOMY)         |  |  |
|                      | SINKS                             |  |  |
| SOUTH AFRICA         |                                   |  |  |
| USE                  | REPUBLIC OF SOUTH AFRICA          |  |  |
| SOUTH AMERICA        |                                   |  |  |
| 1305                 |                                   |  |  |
| GS                   | CONTINENTS                        |  |  |
|                      | #SOUTH AMERICA                    |  |  |
| RT                   | ANDES MOUNTAINS (SOUTH AMERICA)   |  |  |
|                      | ARGENTINA                         |  |  |
|                      | BOLIVIA                           |  |  |
|                      | BRAZIL                            |  |  |
|                      | CENTRAL AMERICA                   |  |  |
|                      | CHILE                             |  |  |
|                      | COLOMBIA                          |  |  |
|                      | ECUADOR                           |  |  |
|                      | FRENCH GUIANA                     |  |  |
|                      | GUYANA                            |  |  |
|                      | MAGDALENA-CAUCA VALLEY (COLOMBIA) |  |  |
|                      | PARAGUAY                          |  |  |
|                      | PERU                              |  |  |
|                      | SURINAM                           |  |  |
|                      | TRINIDAD AND TOBAGO               |  |  |
|                      | URUGUAY                           |  |  |
|                      | VENEZUELA                         |  |  |
| SOUTH CAROLINA       |                                   |  |  |
| 1305                 |                                   |  |  |
| GS                   | NATIONS                           |  |  |
|                      | .UNITED STATES                    |  |  |
|                      | .#SOUTH CAROLINA                  |  |  |
| RT                   | SAND HILLS REGION (GA-NC-SC)      |  |  |
| SOUTH DAKOTA         |                                   |  |  |
| 1305                 |                                   |  |  |
| GS                   | NATIONS                           |  |  |
|                      | .UNITED STATES                    |  |  |
|                      | .#SOUTH DAKOTA                    |  |  |
| RT                   | BLACK HILLS (SD-WY)               |  |  |
|                      | MISSOURI RIVER (US)               |  |  |
| SOUTH KOREA          |                                   |  |  |
| 1305                 |                                   |  |  |
| UF                   | REPUBLIC OF KOREA                 |  |  |
| GS                   | NATIONS                           |  |  |
|                      | #SOUTH KOREA                      |  |  |
| RT                   | ASIA                              |  |  |
|                      | % KOREA                           |  |  |
|                      | NORTH KOREA                       |  |  |
| SOUTH VIETNAM        |                                   |  |  |
| USE                  | VIETNAM                           |  |  |
| SOUTH WEST AFRICA    |                                   |  |  |
| USE                  | NAMIBIA                           |  |  |
| SOUTHEAST ASIA       |                                   |  |  |
| 1305                 |                                   |  |  |
| GS                   | REGIONS                           |  |  |
|                      | #SOUTHEAST ASIA                   |  |  |
| RT                   | ASIA                              |  |  |
|                      | VIETNAM                           |  |  |
| SOUTHERN CALIFORNIA  |                                   |  |  |
| 1305                 |                                   |  |  |
| GS                   | REGIONS                           |  |  |
|                      | #SOUTHERN CALIFORNIA              |  |  |
| RT                   | CALIFORNIA                        |  |  |
|                      | MEXICO                            |  |  |
|                      | NEVADA                            |  |  |
|                      | PACIFIC OCEAN                     |  |  |
|                      | UNITED STATES                     |  |  |
| SOUTHERN HEMISPHERE  |                                   |  |  |
| 1305                 |                                   |  |  |
| GS                   | #SOUTHERN HEMISPHERE              |  |  |
|                      | .ANTARCTIC REGIONS                |  |  |
|                      | .MCMURDO SOUND                    |  |  |
|                      | .ROSS ICE SHELF                   |  |  |
| RT                   | % HEMISPHERES                     |  |  |
|                      | NORTHERN HEMISPHERE               |  |  |
| SOUTHERN OSCILLATION |                                   |  |  |
| SOUTHERN SKY         |                                   |  |  |
| SOUTHERN OSCILLATION |                                   |  |  |
| 1310                 |                                   |  |  |
| GS                   | OSCILLATIONS                      |  |  |
|                      | #SOUTHERN OSCILLATION             |  |  |
| RT                   | ANOMALIES                         |  |  |
|                      | ATMOSPHERIC CIRCULATION           |  |  |
|                      | ATMOSPHERIC PRESSURE              |  |  |
|                      | CLIMATE                           |  |  |
|                      | EL NINO                           |  |  |
|                      | PERIODIC VARIATIONS               |  |  |
|                      | PRESSURE OSCILLATIONS             |  |  |
|                      | SOUTHERN HEMISPHERE               |  |  |
| SOUTHERN SKY         |                                   |  |  |
| 3001                 |                                   |  |  |
| RT                   | ASTRONOMICAL CATALOGS             |  |  |
|                      | ASTRONOMICAL OBSERVATORIES        |  |  |
|                      | ASTRONOMICAL PHOTOGRAPHY          |  |  |
|                      | ASTRONOMICAL SPECTROSCOPY         |  |  |
|                      | ASTRONOMY                         |  |  |
|                      | NORTHERN SKY                      |  |  |
|                      | SKY SURVEYS (ASTRONOMY)           |  |  |
|                      | SOUTHERN HEMISPHERE               |  |  |
| SOUTHERN YEMEN       |                                   |  |  |
| 1305                 |                                   |  |  |
| UF                   | ADEN                              |  |  |
| GS                   | NATIONS                           |  |  |
|                      | #SOUTHERN YEMEN                   |  |  |
|                      | REGIONS                           |  |  |
|                      | #SOUTHERN YEMEN                   |  |  |
| RT                   | ASIA                              |  |  |
| SOVEREIGNTY          |                                   |  |  |
| 3402 3403            |                                   |  |  |
| RT                   | INTERNATIONAL COOPERATION         |  |  |
|                      | INTERNATIONAL LAW                 |  |  |
|                      | POLITICS                          |  |  |
|                      | VOTING                            |  |  |
| SOVIET SATELLITES    |                                   |  |  |
| 3110                 |                                   |  |  |
| GS                   | ARTIFICIAL SATELLITES             |  |  |
|                      | #SOVIET SATELLITES                |  |  |
|                      | ..COSMOS SATELLITES               |  |  |
|                      | ...COSMOS 2 SATELLITE             |  |  |
|                      | ...COSMOS 3 SATELLITE             |  |  |
|                      | ...COSMOS 5 SATELLITE             |  |  |
|                      | ...COSMOS 6 SATELLITE             |  |  |
|                      | ...COSMOS 14 SATELLITE            |  |  |
|                      | ...COSMOS 44 SATELLITE            |  |  |
|                      | ...COSMOS 54 SATELLITE            |  |  |

## NASA THESAURUS HIERARCHICAL UPDATE

| RT                      | %                       | SPACE                   | 3009                    | 3409                    | SN                      | (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW) | ALGEBRA                 | ANALYSIS (MATHEMATICS)  | CARTAN SPACE            | CISLUNAR SPACE          | DEEP SPACE              | FRACTALS                | FUNCTION SPACE          | HYPERSPACES              | SET THEORY              | SPATIAL DEPENDENCIES    | SPACE ADAPTATION SYNDROME | O401                    | RT                      | AEROSPACE MEDICINE      | BIOASTRONAUTICS         | BIOLOGICAL EFFECTS      | LONG DURATION SPACE FLIGHT | MANNED SPACE FLIGHT     | MOTION SICKNESS         | PHYSIOLOGICAL EFFECTS   | PSYCHOLOGICAL EFFECTS   | SPACE FLIGHT STRESS     | SPACE PSYCHOLOGY        | WEIGHTLESSNESS          | SPACE ARROW SATELLITE   | USE                     | COSMOS 149 SATELLITE    | SPACE BASED RADAR       | 3102                    | GS                      | RADAR                   | #SPACE BASED RADAR      | RT                      | AIRBORNE RADAR          | ANTENNA ARRAYS          | RADIATIONEFFECTS        |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |       |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|---------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------|
| ..COSMOS 71 SATELLITE   | ..LUNIK 12 LUNAR PROBE  | ..LUNIK 13 LUNAR PROBE  | ..LUNIK 14 LUNAR PROBE  | ..LUNIK 16 LUNAR PROBE  | ..LUNIK 17 LUNAR PROBE  | ..LUNIK 19 LUNAR PROBE                                                             | ..LUNIK 20 LUNAR PROBE  | ..LUNIK 22 LUNAR PROBE  | ..MARS 1 SPACECRAFT     | ..MARS 2 SPACECRAFT     | ..MARS 3 SPACECRAFT     | ..MARS 4 SPACECRAFT     | ..MARS 5 SPACECRAFT     | ..MARS 6 SPACECRAFT      | ..MARS 7 SPACECRAFT     | ..MIR SPACE STATION     | ..SALYUT SPACE STATION    | ..SALYUT SPACECRAFT     | ..SPUTNIK SATELLITES    | ..SPUTNIK 1 SATELLITE   | ..SPUTNIK 2 SATELLITE   | ..SPUTNIK 3 SATELLITE   | ..SPUTNIK 4 SATELLITE      | ..SPUTNIK 5 SATELLITE   | ..VENERA SATELLITES     | ..VENERA 2 SATELLITE    | ..VENERA 3 SATELLITE    | ..VENERA 4 SATELLITE    | ..VENERA 5 SATELLITE    | ..VENERA 6 SATELLITE    | ..VENERA 7 SATELLITE    | ..VENERA 8 SATELLITE    | ..VENERA 9 SATELLITE    | ..VENERA 10 SATELLITE   | ..VENERA 11 SATELLITE   | ..VENERA 12 SATELLITE   | ..ZOND SPACE PROBES     | ..ZOND 1 SPACE PROBE    | ..ZOND 2 SPACE PROBE    | ..ZOND 3 SPACE PROBE    | ..ZOND 4 SPACE PROBE    | ..ZOND 5 SPACE PROBE    | ..ZOND 6 SPACE PROBE    | ..ZOND 7 SPACE PROBE    | ..ZOND 8 SPACE PROBE    | ..ZOND 8 SPACE PROBE    | RT % SPACECRAFT         | SOVIET UNION            | USE                     | U.S.S.R.                | SOYBEANS                | O409 O505               | GS                      | FARM CROPS              | ..LEGUMINOUS PLANTS     | ..SOYBEANS              |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |       |
| ..COSMOS 110 SATELLITE  | ..COSMOS 137 SATELLITE  | ..COSMOS 144 SATELLITE  | ..COSMOS 149 SATELLITE  | ..COSMOS 166 SATELLITE  | ..COSMOS 186 SATELLITE  | ..COSMOS 188 SATELLITE                                                             | ..COSMOS 206 SATELLITE  | ..COSMOS 213 SATELLITE  | ..COSMOS 224 SATELLITE  | ..COSMOS 225 SATELLITE  | ..COSMOS 381 SATELLITE  | ..COSMOS 954 SATELLITE  | ..COSMOS 1129 SATELLITE | ..INTERCOSMOS SATELLITES | ..COSMOS 782 SATELLITE  | ..COSMOS 936 SATELLITE  | ..MOLNIYA SATELLITES      | ..PROGNOZ SATELLITES    | ..PROTON SATELLITES     | ..PROTON 1 SATELLITE    | ..PROTON 2 SATELLITE    | ..PROTON 3 SATELLITE    | ..PROTON 4 SATELLITE       | ..RADUGA SATELLITE      | ..SPUTNIK SATELLITES    | ..SPUTNIK 1 SATELLITE   | ..SPUTNIK 2 SATELLITE   | ..SPUTNIK 3 SATELLITE   | ..SPUTNIK 4 SATELLITE   | ..SPUTNIK 5 SATELLITE   | ..VENERA SATELLITES     | ..VENERA 2 SATELLITE    | ..VENERA 3 SATELLITE    | ..VENERA 4 SATELLITE    | ..VENERA 5 SATELLITE    | ..VENERA 6 SATELLITE    | ..VENERA 7 SATELLITE    | ..VENERA 8 SATELLITE    | ..VENERA 9 SATELLITE    | ..VENERA 10 SATELLITE   | ..VENERA 11 SATELLITE   | ..VENERA 12 SATELLITE   | SOVIET SPACECRAFT       | 3110                    | GS                      | #SOVIET SPACECRAFT      | ..BURAN SPACE SHUTTLE   | ..LUNIK LUNAR PROBES    | ..LUNIK 2 LUNAR PROBE   | ..LUNIK 3 LUNAR PROBE   | ..LUNIK 9 LUNAR PROBE   | ..LUNIK 10 LUNAR PROBE  | ..LUNIK 11 LUNAR PROBE  |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |       |
| ..COSMOS 13 LUNAR PROBE | ..COSMOS 14 LUNAR PROBE | ..COSMOS 15 LUNAR PROBE | ..COSMOS 16 LUNAR PROBE | ..COSMOS 17 LUNAR PROBE | ..COSMOS 18 LUNAR PROBE | ..COSMOS 19 LUNAR PROBE                                                            | ..COSMOS 20 LUNAR PROBE | ..COSMOS 21 LUNAR PROBE | ..COSMOS 22 LUNAR PROBE | ..COSMOS 23 LUNAR PROBE | ..COSMOS 24 LUNAR PROBE | ..COSMOS 25 LUNAR PROBE | ..COSMOS 26 LUNAR PROBE | ..COSMOS 27 LUNAR PROBE  | ..COSMOS 28 LUNAR PROBE | ..COSMOS 29 LUNAR PROBE | ..COSMOS 30 LUNAR PROBE   | ..COSMOS 31 LUNAR PROBE | ..COSMOS 32 LUNAR PROBE | ..COSMOS 33 LUNAR PROBE | ..COSMOS 34 LUNAR PROBE | ..COSMOS 35 LUNAR PROBE | ..COSMOS 36 LUNAR PROBE    | ..COSMOS 37 LUNAR PROBE | ..COSMOS 38 LUNAR PROBE | ..COSMOS 39 LUNAR PROBE | ..COSMOS 40 LUNAR PROBE | ..COSMOS 41 LUNAR PROBE | ..COSMOS 42 LUNAR PROBE | ..COSMOS 43 LUNAR PROBE | ..COSMOS 44 LUNAR PROBE | ..COSMOS 45 LUNAR PROBE | ..COSMOS 46 LUNAR PROBE | ..COSMOS 47 LUNAR PROBE | ..COSMOS 48 LUNAR PROBE | ..COSMOS 49 LUNAR PROBE | ..COSMOS 50 LUNAR PROBE | ..COSMOS 51 LUNAR PROBE | ..COSMOS 52 LUNAR PROBE | ..COSMOS 53 LUNAR PROBE | ..COSMOS 54 LUNAR PROBE | ..COSMOS 55 LUNAR PROBE | ..COSMOS 56 LUNAR PROBE | ..COSMOS 57 LUNAR PROBE | ..COSMOS 58 LUNAR PROBE | ..COSMOS 59 LUNAR PROBE | ..COSMOS 60 LUNAR PROBE | ..COSMOS 61 LUNAR PROBE | ..COSMOS 62 LUNAR PROBE | ..COSMOS 63 LUNAR PROBE | ..COSMOS 64 LUNAR PROBE | ..COSMOS 65 LUNAR PROBE | ..COSMOS 66 LUNAR PROBE | ..COSMOS 67 LUNAR PROBE | ..COSMOS 68 LUNAR PROBE | ..COSMOS 69 LUNAR PROBE | ..COSMOS 70 LUNAR PROBE | ..COSMOS 71 LUNAR PROBE | ..COSMOS 72 LUNAR PROBE | ..COSMOS 73 LUNAR PROBE | ..COSMOS 74 LUNAR PROBE | ..COSMOS 75 LUNAR PROBE | ..COSMOS 76 LUNAR PROBE | ..COSMOS 77 LUNAR PROBE | ..COSMOS 78 LUNAR PROBE | ..COSMOS 79 LUNAR PROBE | ..COSMOS 80 LUNAR PROBE | ..COSMOS 81 LUNAR PROBE | ..COSMOS 82 LUNAR PROBE | ..COSMOS 83 LUNAR PROBE | ..COSMOS 84 LUNAR PROBE | ..COSMOS 85 LUNAR PROBE | ..COSMOS 86 LUNAR PROBE | ..COSMOS 87 LUNAR PROBE | ..COSMOS 88 LUNAR PROBE | ..COSMOS 89 LUNAR PROBE | ..COSMOS 90 LUNAR PROBE | ..COSMOS 91 LUNAR PROBE | ..COSMOS 92 LUNAR PROBE | ..COSMOS 93 LUNAR PROBE | ..COSMOS 94 LUNAR PROBE | ..COSMOS 95 LUNAR PROBE | ..COSMOS 96 LUNAR PROBE | ..COSMOS 97 LUNAR PROBE | ..COSMOS 98 LUNAR PROBE | ..COSMOS 99 LUNAR PROBE | ..COSMOS 100 LUNAR PROBE | ..COSMOS 101 LUNAR PROBE | ..COSMOS 102 LUNAR PROBE | ..COSMOS 103 LUNAR PROBE | ..COSMOS 104 LUNAR PROBE | ..COSMOS 105 LUNAR PROBE | ..COSMOS 106 LUNAR PROBE | ..COSMOS 107 LUNAR PROBE | ..COSMOS 108 LUNAR PROBE | ..COSMOS 109 LUNAR PROBE | ..COSMOS 110 LUNAR PROBE | ..COSMOS 111 LUNAR PROBE | ..COSMOS 112 LUNAR PROBE | ..COSMOS 113 LUNAR PROBE | ..COSMOS 114 LUNAR PROBE | ..COSMOS 115 LUNAR PROBE | ..COSMOS 116 LUNAR PROBE | ..COSMOS 117 LUNAR PROBE | ..COS |



|                                       |                                     |                             |
|---------------------------------------|-------------------------------------|-----------------------------|
| PROTON DENSITY (CONCENTRATION)        | FLIGHT SIMULATORS                   | INTERSTELLAR SPACECRAFT     |
| SPACE DETECTION AND TRACKING SYSTEM   | HIGH VACUUM ORBITAL SIMULATOR       | JUPITER RINGS               |
| 0708 0709 1109 3009                   | LANGLEY COMPLEX COORDINATOR         | LUNAR EXPLORATION           |
| UF SPADATS (TRACKING SYSTEM)          | MOTION SIMULATORS                   | MAGELLAN PROJECT (NASA)     |
| GS STATIONS                           | SOLAR SIMULATION                    | MANNED MARS MISSIONS        |
| .GROUND STATIONS                      | THERMAL SIMULATION                  | MANNED SPACE FLIGHT         |
| .#SPACE DETECTION AND TRACKING SYSTEM | VACUUM CHAMBERS                     | MARS SAMPLE RETURN MISSIONS |
| .#SPACE DETECTION AND TRACKING SYSTEM | VIRTUAL REALITY                     | MARS 69 PROJECT             |
| .TRACKING STATIONS                    | SPACE ENVIRONMENTAL LUBRICATION     | MARS 71 PROJECT             |
| .#SPACE DETECTION AND TRACKING SYSTEM | USE SPACECRAFT LUBRICATION          | PLANETARY BASES             |
| TRACKING NETWORKS                     | SPACE ERECTABLE STRUCTURES          | PLANETARY COMPOSITION       |
| #SPACE DETECTION AND TRACKING SYSTEM  | 3109 GS #SPACE ERECTABLE STRUCTURES | PLANETARY GEOLOGY           |
| RT MINITRACK SYSTEM                   | .INFATABLE SPACECRAFT               | SOLAR MAXIMUM MISSION-A     |
| MISSILE TRACKING                      | ..BEACON SATELLITES                 | TOPS (SPACECRAFT)           |
| OPTICAL TRACKING                      | ...EXPLORER 22 SATELLITE            | VIKING LANDER SPACECRAFT    |
| PHOTOGRAPHIC TRACKING                 | EXPANDABLE STRUCTURES               | VIKING LANDER 1             |
| POLYSTATION DOPPLER TRACKING SYSTEM   | FOLDING STRUCTURES                  | VIKING LANDER 2             |
| SPACECRAFT TRACKING                   | INFATABLE STRUCTURES                | VIKING MARS PROGRAM         |
| STDN (NETWORK)                        | LARGE DEPLOYABLE REFLECTOR          | VIKING ORBITER 1            |
| % SYSTEMS                             | LARGE SPACE STRUCTURES              | VIKING ORBITER 2            |
| SPACE DIVERSITY                       | MAYPOLE ANTENNAS                    | VIKING 1 SPACECRAFT         |
| USE RECEPTION DIVERSITY               | ORBITAL ASSEMBLY                    | VIKING 2 SPACECRAFT         |
| SPACE ELECTRIC ROCKET TESTS           | RIGID STRUCTURES                    | SPACE FLIGHT                |
| 2803 3106 3409                        | SELF ERECTING DEVICES               | 3110 3409                   |
| UF SERT (ROCKET TESTS)                | SPACE STATION STRUCTURES            | GS #SPACE FLIGHT            |
| GS ENGINE TESTS                       | SPACE TECHNOLOGY EXPERIMENTS        | .INTERPLANETARY FLIGHT      |
| #SPACE ELECTRIC ROCKET TESTS          | SPACECRAFT MODULES                  | .INTERSTELLAR TRAVEL        |
| ELECTRIC ROCKET ENGINES               | SPACECRAFT STRUCTURES               | .LONG DURATION SPACE FLIGHT |
| FLIGHT TESTS                          | % STRUCTURES                        | .LUNAR FLIGHT               |
| GROUND TESTS                          | SPACE EXPLORATION                   | .MANNED SPACE FLIGHT        |
| SERT 1 SPACECRAFT                     | 3004 3007 3009 3409                 | ..APOLLO FLIGHTS            |
| SERT 2 SPACECRAFT                     | UF PLANETARY EXPLORATION            | ...APOLLO 5 FLIGHT          |
| % TESTS                               | GS EXPLORATION                      | ...APOLLO 6 FLIGHT          |
| SPACE ENVIRONMENT                     | RT #SPACE EXPLORATION               | ...APOLLO 7 FLIGHT          |
| USE AEROSPACE ENVIRONMENTS            | ASTEROID MISSIONS                   | ...APOLLO 8 FLIGHT          |
| 0502 1107 3009                        | ASTRODYNAMICS                       | ...APOLLO 9 FLIGHT          |
| GS SIMULATION                         | % ASTRONAUTICS                      | ...APOLLO 10 FLIGHT         |
| .ENVIRONMENT SIMULATION               | BIOASTRONAUTICS                     | ...APOLLO 11 FLIGHT         |
| .#SPACE ENVIRONMENT SIMULATION        | CASSINI MISSION                     | ...APOLLO 12 FLIGHT         |
| ...WEIGHTLESSNESS SIMULATION          | EXTRATERRESTRIAL ENVIRONMENTS       | ...APOLLO 13 FLIGHT         |
| ...NEUTRAL BUOYANCY SIMULATION        | EXTRATERRESTRIAL RESOURCES          | ...APOLLO 14 FLIGHT         |
| ALTITUDE SIMULATION                   | FRENCH SPACE PROGRAM                | ...APOLLO 15 FLIGHT         |
| ATMOSPHERIC ENTRY SIMULATION          | GULLIVER PROGRAM                    | ...APOLLO 16 FLIGHT         |
| FLIGHT SIMULATION                     | INTERNATIONAL SPACE YEAR            | ...APOLLO 17 FLIGHT         |
|                                       | INTERPLANETARY FLIGHT               | ..GEMINI FLIGHTS            |
|                                       | INTERPLANETARY SPACECRAFT           | ...GEMINI 3 FLIGHT          |
|                                       |                                     | ...GEMINI 4 FLIGHT          |
|                                       |                                     | ...GEMINI 5 FLIGHT          |
|                                       |                                     | ...GEMINI 6 FLIGHT          |
|                                       |                                     | ...GEMINI 7 FLIGHT          |
|                                       |                                     | ...GEMINI 8 FLIGHT          |
|                                       |                                     | ...GEMINI 9 FLIGHT          |
|                                       |                                     | ...GEMINI 10 FLIGHT         |

NASA THESAURUS HIERARCHICAL UPDATE

...GEMINI 11 FLIGHT  
...GEMINI 12 FLIGHT  
...MANNED REENTRY  
...MERCURY FLIGHTS  
...MERCURY MA-1 FLIGHT  
...MERCURY MA-2 FLIGHT  
...MERCURY MA-3 FLIGHT  
...MERCURY MA-4 FLIGHT  
...MERCURY MA-5 FLIGHT  
...MERCURY MA-6 FLIGHT  
...MERCURY MA-7 FLIGHT  
...MERCURY MA-8 FLIGHT  
...MERCURY MA-9 FLIGHT  
...MERCURY MR-1 FLIGHT  
...MERCURY MR-2 FLIGHT  
...MERCURY MR-3 FLIGHT  
...MERCURY MR-4 FLIGHT  
...SPACE SHUTTLE MISSIONS  
...SPACE SHUTTLE MISSION 31-A  
...SPACE SHUTTLE MISSION 31-B  
...SPACE SHUTTLE MISSION 31-C  
...SPACE SHUTTLE MISSION 31-D  
...SPACE SHUTTLE MISSION 41-A  
...SPACE SHUTTLE MISSION 41-B  
...SPACE SHUTTLE MISSION 41-C  
...SPACE SHUTTLE MISSION 41-D  
...SPACE SHUTTLE MISSION 41-G  
...SPACE SHUTTLE MISSION 51-A  
...SPACE SHUTTLE MISSION 51-B  
...SPACE SHUTTLE MISSION 51-C  
...SPACE SHUTTLE MISSION 51-D  
...SPACE SHUTTLE MISSION 51-E  
...SPACE SHUTTLE MISSION 51-F  
...SPACE SHUTTLE MISSION 51-G  
...SPACE SHUTTLE MISSION 51-H  
...SPACE SHUTTLE MISSION 51-I  
...SPACE SHUTTLE MISSION 51-J  
...SPACE SHUTTLE MISSION 51-L  
...SPACE SHUTTLE MISSION 61-A  
...SPACE SHUTTLE MISSION 61-B  
...SPACE SHUTTLE MISSION 61-C  
...SPACE SHUTTLE MISSION 61-E  
...RETURN TO EARTH SPACE FLIGHT  
AEROSPACE ENVIRONMENTS  
APOLLO SOYUZ TEST PROJECT  
ASCENT PROPULSION SYSTEMS  
ASTRODYNAMICS  
% ASTRONAUTICS  
ATMOSPHERIC ENTRY  
AUXILIARY PROPULSION  
BIOASTRONAUTICS  
CELESTIAL BODIES  
EXPEDITIONS  
EXPLORATION  
EXTRAVEHICULAR ACTIVITY

...FLIGHT MECHANICS  
...FLIGHT OPTIMIZATION  
...FLIGHT SIMULATION  
...FLYBY MISSIONS  
...GRAND TOURS  
...MARINER JUPITER-SATURN FLYBY  
...MARINER JUPITER-URANUS FLYBY  
...METEOROLOGICAL FLIGHT  
...MISSIONS  
...ORBITS  
...PHYSICS AND CHEMISTRY EXPERIMENT  
...IN SPACE  
...POINTING CONTROL SYSTEMS  
...PROPULSION  
...REENTRY  
...ROCKET FLIGHT  
...ROCKETS  
...SOLAR SAILS  
...SPACE TRANSPORTATION SYSTEM FLIGHTS  
...SPACECRAFT GUIDANCE  
...SPACECRAFT MANEUVERS  
...SPACECRAFT PROPULSION  
...SUBORBITAL FLIGHT  
...TRAJECTORIES  
...VIKING LANDER SPACECRAFT  
...VIKING LANDER 1  
...VIKING LANDER 2  
...VIKING ORBITER SPACECRAFT  
...VIKING ORBITER 1  
...VIKING ORBITER 2  
...VIKING 1 SPACECRAFT  
...VIKING 2 SPACECRAFT

SPACE FLIGHT FEEDING  
0505 0507 3104  
RT  
CONSUMABLES (SPACECREW SUPPLIES)  
DEHYDRATED FOOD  
DIETS  
EATING  
% FOOD  
FOOD INTAKE  
FOOD PRODUCTION (IN SPACE)  
LIFE SUPPORT SYSTEMS  
NUTRITION  
NUTRITIONAL REQUIREMENTS  
WASTE DISPOSAL

SPACE FLIGHT STRESS  
0401 0408 0410 0503 0506  
GS  
FLIGHT STRESS (BIOLOGY)  
#SPACE FLIGHT STRESS  
RT  
BOREDOM  
% FLIGHT STRESS  
GRAVITATIONAL PHYSIOLOGY

LOWER BODY NEGATIVE PRESSURE  
MANNED SPACE FLIGHT  
SPACE ADAPTATION SYNDROME  
SPACE PSYCHOLOGY  
STRESS (PHYSIOLOGY)  
STRESS (PSYCHOLOGY)  
WEIGHTLESSNESS

SPACE FLIGHT TRACKING AND DATA NETWORK  
0709 1109  
GS  
TRACKING NETWORKS  
#SPACE FLIGHT TRACKING AND DATA NETWORK  
RT % DATA  
DATA ACQUISITION  
GLOBAL TRACKING NETWORK  
GROUND STATIONS  
SATELLITE TRACKING  
STATIONS  
STDN (NETWORK)  
TRACKING STATIONS

SPACE FLIGHT TRAINING  
0401 0502 3104 3409  
GS  
EDUCATION  
.FLIGHT TRAINING  
.#SPACE FLIGHT TRAINING  
RT  
ASTRONAUT TRAINING  
PILOT TRAINING  
SPACECRAFT CABIN SIMULATORS  
TRAINING SIMULATORS

SPACE GLIDERS  
USE LIFTING REENTRY VEHICLES

SPACE GLOSSARIES  
3405  
RT  
BIBLIOGRAPHIES  
DICTIONARIES  
DOCUMENTATION  
INDEXES (DOCUMENTATION)  
INFORMATION RETRIEVAL  
THESAURI

SPACE HABITATS  
3009  
RT  
AEROSPACE ENVIRONMENTS  
CLOSED ECOLOGICAL SYSTEMS  
LIFE SUPPORT SYSTEMS  
SPACE COLONIES  
SPACE STATIONS  
SPACECREWS  
TERRAFORMING

SPACE HEATING (BUILDINGS)

|                                   |                                      |                                            |                          |                             |
|-----------------------------------|--------------------------------------|--------------------------------------------|--------------------------|-----------------------------|
| 0504                              | HEATING                              | ..ADVANCED TECHNOLOGY LABORATORY           | RT                       | ASTRONAUT TRAINING          |
| GS                                | #SPACE HEATING (BUILDINGS)           | ..ATMOSPHERIC CLOUD PHYSICS LAB (SPACELAB) | %                        | ASTRONAUTICS                |
| RT                                | AIR CONDITIONING                     | ..EARTH VIEWING APPLICATIONS               |                          | EXTRAVEHICULAR ACTIVITY     |
|                                   | ENVIRONMENTAL ENGINEERING            | LABORATORY                                 |                          | ORBITAL WORKERS             |
|                                   | HEATING EQUIPMENT                    | ..LONG DURATION EXPOSURE FACILITY          |                          | PAYLOAD TRANSFER            |
|                                   | RESIDENTIAL ENERGY                   | ..MANNED ORBITAL LABORATORIES              |                          | REMOTE MANIPULATOR SYSTEM   |
|                                   | SOLAR ATRIUMS                        | ...SKYLAB 1                                | SPACE MANUFACTURING      |                             |
|                                   | SOLAR HEATING                        | ...SKYLAB 2                                | 1504 1506 1507 3404      |                             |
|                                   | SOLAR HOUSES                         | ...SKYLAB 3                                | GS                       | FABRICATION                 |
|                                   | TEMPERATURE CONTROL                  | ...SKYLAB 4                                |                          | #SPACE MANUFACTURING        |
|                                   | WASTE ENERGY UTILIZATION             | ...SPACELAB                                |                          | MANUFACTURING               |
|                                   |                                      | RT % AEROSPACE SCIENCES                    |                          | #SPACE MANUFACTURING        |
| SPACE INDUSTRIALIZATION           |                                      | ARTIFICIAL SATELLITES                      |                          | SPACE INDUSTRIALIZATION     |
| 3402                              |                                      | GEOPHYSICAL SATELLITES                     |                          | #SPACE MANUFACTURING        |
| GS                                | #SPACE INDUSTRIALIZATION             | LUNAR LABORATORIES                         | RT                       | AEROSPACE ENVIRONMENTS      |
|                                   | .SPACE MANUFACTURING                 | MIR SPACE STATION                          |                          | ASSEMBLING                  |
|                                   | .SPACE PROCESSING                    | ORBITAL WORKSHOPS                          |                          | COMMERCIAL SPACECRAFT       |
| RT                                | COMMERCIAL SPACECRAFT                | RESEARCH FACILITIES                        |                          | CONSTRUCTION                |
|                                   | ECONOMIC DEVELOPMENT                 | RESEARCH VEHICLES                          |                          | HIGH VACUUM                 |
|                                   | ENERGY CONVERSION                    | SAIL PROJECT                               |                          | INDUSTRIES                  |
|                                   | INDUSTRIES                           | SALYUT SPACE STATION                       |                          | LEVITATION MELTING          |
|                                   | LUNAR MINING                         | SORTIE SYSTEMS                             |                          | LIQUID BRIDGES              |
|                                   | MANUFACTURING                        | SPACE STATION FREEDOM                      |                          | LOW GRAVITY MANUFACTURING   |
| %                                 | PRODUCT DEVELOPMENT                  | SPACE STATIONS                             |                          | % MICROGRAVITY APPLICATIONS |
|                                   | PRODUCTS                             | SPACEBORNE EXPERIMENTS                     |                          | SPACE COMMERCIALIZATION     |
|                                   | RESEARCH FACILITIES                  | % SPACECRAFT                               |                          | SPACE PROCESSING            |
| SPACE COMMERCIALIZATION           |                                      |                                            |                          | SPACEBORNE EXPERIMENTS      |
| SPACE INFRARED TELESCOPE FACILITY |                                      | SPACE LAW                                  | SPACE MECHANICS          | TECHNOLOGIES                |
| 3001                              |                                      | 3401 3403 3409                             | 0709 1901 2308 3006 3009 | VACUUM EFFECTS              |
| UF                                | SIRTF                                | GS LAW (JURISPRUDENCE)                     | GS                       | WEIGHTLESSNESS              |
| GS                                | ARTIFICIAL SATELLITES                | .INTERNATIONAL LAW                         |                          |                             |
|                                   | .SCIENTIFIC SATELLITES               | .#SPACE LAW                                |                          |                             |
|                                   | ..ASTRONOMICAL SATELLITES            | RT AIR LAW                                 |                          |                             |
|                                   | ..#SPACE INFRARED TELESCOPE FACILITY | DIRECT BROADCAST SATELLITES                |                          |                             |
|                                   | OBSERVATORIES                        | INSURANCE (CONTRACTS)                      |                          |                             |
|                                   | .ASTRONOMICAL OBSERVATORIES          | OUTER SPACE TREATY                         |                          |                             |
|                                   | ..#SPACE INFRARED TELESCOPE FACILITY | SABOTAGE                                   |                          |                             |
|                                   | TELESCOPES                           | SPACE LOGISTICS                            |                          |                             |
|                                   | .INFRARED TELESCOPES                 | 0707 1103 1105 3006 3104 3109 3502         | SPACE LOGISTICS          |                             |
|                                   | .#SPACE INFRARED TELESCOPE FACILITY  | GS LOGISTICS                               | GS                       |                             |
|                                   | .SPACEBORNE TELESCOPES               | #SPACE LOGISTICS                           | RT                       |                             |
|                                   | .#SPACE INFRARED TELESCOPE FACILITY  | CONSUMABLES (SPACECRAFT)                   |                          |                             |
|                                   | INFRARED ASTRONOMY                   | EXTRATERRESTRIAL RESOURCES                 |                          |                             |
|                                   | SPACEBORNE ASTRONOMY                 | MANNED SPACE FLIGHT                        |                          |                             |
|                                   |                                      | SPACECRAFT CABIN SIMULATORS                |                          |                             |
| RT                                |                                      | SPACECREW TRANSFER                         | SPACE MEDICINE           |                             |
|                                   |                                      | STOWAGE (ONBOARD EQUIPMENT)                | USE AEROSPACE MEDICINE   |                             |
| SPACE LABORATORIES                |                                      |                                            |                          |                             |
| 3104 3107 3109 3409               |                                      | SPACE MAINTENANCE                          | SPACE MISSIONS           |                             |
| GS                                | LABORATORIES                         | 1105 3104 3109                             | GS                       | #SPACE MISSIONS             |
|                                   | #SPACE LABORATORIES                  | GS MAINTENANCE                             |                          | .CASSINI MISSION            |
|                                   |                                      | #SPACE MAINTENANCE                         |                          | .CLUSTER MISSION            |

# NASA THESAURUS HIERARCHICAL UPDATE

.FLYBY MISSIONS  
 ...ASTEROID MISSIONS  
 ...COMET RENDEZVOUS ASTEROID FLYBY MISSION  
 ..GIOTTO MISSION  
 ..GRAND TOURS  
 ...MARINER JUPITER-SATURN FLYBY  
 ...MARINER JUPITER-URANUS FLYBY  
 ...VOYAGER 1977 MISSION  
 ...MARINER VENUS-MERCURY 1973  
 ...MARINER-MERCURY 1973  
 ...MANNED MARS MISSIONS  
 ...MARS SAMPLE RETURN MISSIONS  
 ...SOHO MISSION  
 ...SOLAR MAXIMUM MISSION  
 ...SOLAR MAXIMUM MISSION-A  
 ...STARPROBE MISSION  
 ...ULYSSES MISSION  
 APOLLO SOYUZ TEST PROJECT  
 CHINESE SPACE PROGRAM  
 EARTH-VENUS TRAJECTORIES  
 EUROPEAN SPACE PROGRAMS  
 FRENCH SPACE PROGRAM  
 INDIAN SPACE PROGRAM  
 JAPANESE SPACE PROGRAM  
 MAGELLAN PROJECT (NASA)  
 % MISSIONS  
 SKYLAB 1  
 SKYLAB 2  
 SKYLAB 3  
 SKYLAB 4  
 SPACE PROGRAMS  
 SPACE SHUTTLE MISSIONS  
 % SPACECRAFT  
 TOPS (SPACECRAFT)  
 SPACE NAVIGATION  
 1410 3006 3502 3503  
 GS NAVIGATION  
 #SPACE NAVIGATION  
 ..INTERPLANETARY NAVIGATION  
 RT AIR NAVIGATION  
 ASTRODYNAMICS  
 % ASTRONAUTICS  
 ASTRONAUTICS  
 AUTONOMOUS NAVIGATION  
 CELESTIAL NAVIGATION  
 DIGITAL NAVIGATION  
 EARTH-VENUS TRAJECTORIES  
 GLOBAL POSITIONING SYSTEM  
 INERTIAL NAVIGATION  
 INTERPLANETARY FLIGHT  
 INTERPLANETARY TRAJECTORIES  
 MANNED SPACECRAFT  
 ORBITAL MANEUVERS

ORBITAL MECHANICS  
 ORBITS  
 RADAR NAVIGATION  
 RADIO NAVIGATION  
 REFERENCE STARS  
 SATELLITE GUIDANCE  
 SATELLITE NAVIGATION SYSTEMS  
 SPACECRAFT GUIDANCE  
 SPACECRAFT POSITION INDICATORS  
 STANDARDIZED SPACE GUIDANCE  
 SPACE OBSERVATIONS (FROM EARTH)  
 3004  
 GS OBSERVATION  
 #SPACE OBSERVATIONS (FROM EARTH)  
 RT ASTRONOMICAL INTERFEROMETRY  
 DETECTION  
 RADIO OBSERVATION  
 RECONNAISSANCE  
 SEEING (ASTRONOMY)  
 SPACE SURVEILLANCE (GROUND BASED)  
 VISUAL OBSERVATION  
 SPACE OPERATIONS CENTER (NASA)  
 3009  
 GS ARTIFICIAL SATELLITES  
 .SPACE STATIONS  
 .#SPACE OPERATIONS CENTER (NASA)  
 MANNED SPACECRAFT  
 #SPACE OPERATIONS CENTER (NASA)  
 STATIONS  
 .SPACE STATIONS  
 .#SPACE OPERATIONS CENTER (NASA)  
 RT LARGE SPACE STRUCTURES  
 ORBITAL ASSEMBLY  
 ORBITAL SERVICING  
 % SPACE ORIENTATION  
 0401 0408 0501 0502 0506  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ATTITUDE (INCLINATION)  
 BEARING (DIRECTION)  
 VERTICAL PERCEPTION  
 VISUAL PERCEPTION  
 SPACE PERCEPTION  
 0401 0405 0408  
 UF DEPTH PERCEPTION  
 DISTANCE PERCEPTION  
 FORM PERCEPTION  
 SLANT PERCEPTION  
 PERCEPTION  
 GS SENSORY PERCEPTION

..VISUAL PERCEPTION  
 ..#SPACE PERCEPTION  
 ....AUTOKINESIS  
 BINOCULAR VISION  
 MONOCULAR VISION  
 PERIPHERAL VISION  
 RANGE FINDERS  
 SOUND LOCALIZATION  
 VISUAL FIELDS  
 RT  
 SPACE PHOTOGRAPHY  
 USE SPACEBORNE PHOTOGRAPHY  
 SPACE PLASMA H/V INTERACTION EXPERIMENTS  
 USE SPHINX  
 SPACE PLASMAS  
 2501 3009  
 GS PARTICLES  
 .CHARGED PARTICLES  
 ..ENERGETIC PARTICLES  
 ...PLASMAS (PHYSICS)  
 ...#SPACE PLASMAS  
 ....SOLAR WIND  
 ....STELLAR WINDS  
 AMPTE (SATELLITES)  
 CLUSTER MISSION  
 CRRES (SATELLITE)  
 EARTH MAGNETOSPHERE  
 FLUX TRANSFER EVENTS  
 GEOMAGNETISM  
 IONOPAUSE  
 MAGNETIC FIELD RECONNECTION  
 MAGNETOHYDRODYNAMIC STABILITY  
 MAGNETOHYDRODYNAMICS  
 OPEN PROJECT  
 PLASMA DENSITY  
 PLASMA DIAGNOSTICS  
 PLASMA INTERACTIONS  
 PLASMA LAYERS  
 PLASMA PHYSICS  
 PLASMA WAVES  
 PLASMA-ELECTROMAGNETIC INTERACTION  
 POLAR CUSPS  
 SPHINX  
 WAVE-PARTICLE INTERACTIONS  
 SPACE PLATFORMS  
 3109  
 GS #SPACE PLATFORMS  
 .COLUMBUS SPACE STATION  
 .EURECA (ESA)  
 .LONG DURATION EXPOSURE FACILITY  
 .MAN TENDED FREE FLYERS  
 .SPACE STATION POLAR PLATFORMS

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

.....VIKING ORBITER 1  
 .....VIKING 2 SPACECRAFT  
 .....VIKING LANDER 2  
 .....VIKING ORBITER 2  
 .....ZOND 2 SPACE PROBE  
 .....PIONEER SPACE PROBES  
 .....PIONEER VENUS 2 ENTRY PROBES  
 .....PIONEER VENUS 2 NIGHT PROBE  
 .....PIONEER VENUS 2 SOUNDER PROBE  
 .....PIONEER 1 SPACE PROBE  
 .....PIONEER 2 SPACE PROBE  
 .....PIONEER 3 SPACE PROBE  
 .....PIONEER 4 SPACE PROBE  
 .....PIONEER 5 SPACE PROBE  
 .....PIONEER 6 SPACE PROBE  
 .....PIONEER 7 SPACE PROBE  
 .....PIONEER 8 SPACE PROBE  
 .....PIONEER 9 SPACE PROBE  
 .....PIONEER 10 SPACE PROBE  
 .....PIONEER 11 SPACE PROBE  
 .....SOLAR PROBES  
 .....HELIOS A  
 .....HELIOS B  
 .....HELIOS 1  
 .....HELIOS 2  
 .....STARPROBE SPACECRAFT  
 .....SUNBLAZER SPACE PROBE  
 .....VENUS PROBES  
 .....MAGELLAN SPACECRAFT (NASA)  
 .....MARINER 1 SPACE PROBE  
 .....MARINER 2 SPACE PROBE  
 .....MARINER 5 SPACE PROBE  
 .....MARINER 10 SPACE PROBE  
 .....VENERA SATELLITES  
 .....VENERA 2 SATELLITE  
 .....VENERA 3 SATELLITE  
 .....VENERA 4 SATELLITE  
 .....VENERA 5 SATELLITE  
 .....VENERA 6 SATELLITE  
 .....VENERA 7 SATELLITE  
 .....VENERA 8 SATELLITE  
 .....VENERA 9 SATELLITE  
 .....VENERA 10 SATELLITE  
 .....VENERA 11 SATELLITE  
 .....VENERA 12 SATELLITE  
 .....ZOND 1 SPACE PROBE  
 .....ZOND 3 SPACE PROBE  
 .....ZOND 4 SPACE PROBE  
 .....ZOND 5 SPACE PROBE  
 .....ZOND 6 SPACE PROBE  
 .....ZOND 7 SPACE PROBE  
 .....ZOND 8 SPACE PROBE  
 .....VOYAGER 1 SPACECRAFT  
 .....VOYAGER 2 SPACECRAFT  
 ATLAS ABLE 5 LAUNCH VEHICLE

RT

CASSINI MISSION  
 INTERPLANETARY SPACECRAFT  
 MAGNETIC PROBES  
 MANEUVERABLE SPACECRAFT  
 MARINER PROGRAM  
 METEOROLOGICAL SATELLITES  
 PIONEER PROJECT  
 PIONEER VENUS SPACECRAFT  
 PIONEER VENUS 1 SPACECRAFT  
 % PROBES  
 RADIO OCCULTATION  
 SATELLITE TELEVISION  
 VOYAGER PROJECT  
 VOYAGER 1977 MISSION  
 SPACE PROCESSING  
 3404  
 GS  
 SPACE INDUSTRIALIZATION  
 #SPACE PROCESSING  
 ACOUSTIC LEVITATION  
 BIOPROCESSING  
 COMMERCIAL SPACECRAFT  
 CONTAINERLESS MELTS  
 CRYSTAL GROWTH  
 DIAMOND FILMS  
 ELECTRIC FURNACES  
 FLOAT ZONES  
 LEVITATION MELTING  
 LIQUID BRIDGES  
 LOW GRAVITY MANUFACTURING  
 MARANGONI CONVECTION  
 METALORGANIC CHEMICAL VAPOR  
 DEPOSITION  
 % MICROGRAVITY APPLICATIONS  
 MISCIBILITY GAP  
 ORBITAL WORKSHOPS  
 PROTEIN CRYSTAL GROWTH  
 SINGLE CRYSTALS  
 SPACE COMMERCIALIZATION  
 SPACE MANUFACTURING  
 SPACEBORNE EXPERIMENTS  
 ULTRAPURE METALS  
 SPACE PROCESSING APPLICATIONS ROCKET  
 3502  
 UF  
 SPAR (ROCKET)  
 RT  
 LAUNCH VEHICLES  
 METAL FOAMS  
 PAYLOADS  
 ROCKET VEHICLES  
 WEIGHTLESSNESS  
 SPACE PROGRAMS  
 3409 3009  
 GS  
 PROGRAMS

#SPACE PROGRAMS  
 ...ARGENTINE SPACE PROGRAM  
 ...AUSTRALIAN SPACE PROGRAM  
 ...BRAZILIAN SPACE PROGRAM  
 ...CANADIAN SPACE PROGRAM  
 ...ALOUETTE PROJECT  
 ...CHINESE SPACE PROGRAM  
 ...EUROPEAN SPACE PROGRAMS  
 ...AUSTRIAN SPACE PROGRAM  
 ...BELGIAN SPACE PROGRAM  
 ...CZECHOSLOVAKIAN SPACE PROGRAM  
 ...DANISH SPACE PROGRAM  
 ...FINNISH SPACE PROGRAM  
 ...FRENCH SPACE PROGRAM  
 ...GERMAN SPACE PROGRAM  
 ...GREEK SPACE PROGRAM  
 ...HUNGARIAN SPACE PROGRAM  
 ...ICELANDIC SPACE PROGRAM  
 ...ITALIAN SPACE PROGRAM  
 ...LUXEMBOURG SPACE PROGRAM  
 ...NETHERLANDS SPACE PROGRAM  
 ...NORWEGIAN SPACE PROGRAM  
 ...PORTUGUESE SPACE PROGRAM  
 ...SPANISH SPACE PROGRAM  
 ...SWEDISH SPACE PROGRAM  
 ...SWISS SPACE PROGRAM  
 ...TURKISH SPACE PROGRAM  
 ...U.S.S.R. SPACE PROGRAM  
 ...UK SPACE PROGRAM  
 ...GEOGRAPHIC APPLICATIONS PROGRAM  
 ...INDIAN SPACE PROGRAM  
 ...INDONESIAN SPACE PROGRAM  
 ...ISRAELI SPACE PROGRAM  
 ...JAPANESE SPACE PROGRAM  
 ...MEXICAN SPACE PROGRAM  
 ...NASA SPACE PROGRAMS  
 ...APOLLO APPLICATIONS PROGRAM  
 ...APOLLO PROJECT  
 ...BIOASTRONAUTICAL ORBITAL SPACE  
 SYSTEM  
 ...CENTAUR PROJECT  
 ...EARTH & OCEAN PHYSICS  
 APPLICATIONS PROGRAM  
 ...EARTH RESOURCES PROGRAM  
 ...EARTH RESOURCES SURVEY PROGRAM  
 ...SEASAT PROGRAM  
 ...ECHO PROJECT  
 ...GALILEO PROJECT  
 ...GEMINI PROJECT  
 ...HELIOS PROJECT  
 ...JUPITER PROJECT  
 ...MAGELLAN PROJECT (NASA)  
 ...MARINER PROGRAM  
 ...MARINER VENUS-MERCURY 1973  
 ...MARINER-MERCURY 1973

|                                    |                                   |      |                                     |
|------------------------------------|-----------------------------------|------|-------------------------------------|
| ...MARS 69 PROJECT                 | STRESS (PSYCHOLOGY)               |      | SHUTTLE)                            |
| ...MARS 71 PROJECT                 | SPACE RADIATION                   |      | SPACE SHUTTLE SOLID ROCKET MOTORS   |
| ...MERCURY PROJECT                 | USE EXTRATERRESTRIAL RADIATION    | GS   | SRB (SOLID ROCKET BOOSTERS)         |
| ...NATIONAL LAUNCH VEHICLE PROGRAM |                                   |      | ENGINES                             |
| ...NEW MOONS PROJECT               | SPACE RADIATORS                   |      | .ROCKET ENGINES                     |
| ...NIMBUS PROJECT                  | USE SPACECRAFT RADIATORS          |      | ..BOOSTER ROCKET ENGINES            |
| ...OPEN PROJECT                    |                                   |      | ..#SPACE SHUTTLE BOOSTERS           |
| ...PIONEER PROJECT                 |                                   |      | ...ADVANCED SOLID ROCKET MOTOR      |
| ...PROJECT SETI                    | SPACE RATINGS                     |      | (STS)                               |
| ...RANGER PROJECT                  | 0401 0505                         |      | ..SOLID PROPELLANT ROCKET ENGINES   |
| ...AGENA B RANGER PROGRAM          | GS                                |      | ..#SPACE SHUTTLE BOOSTERS           |
| ...ROVER PROJECT                   | #SPACE RATINGS                    |      | ...ADVANCED SOLID ROCKET MOTOR      |
| ...SAIL PROJECT                    | RATINGS                           |      | (STS)                               |
| ...SATURN PROJECT                  | #SPACE RATINGS                    | RT % | BOOSTERS                            |
| ...SCOUT PROJECT                   | RT % FOOD                         |      | MANNED SPACECRAFT                   |
| ...SKYLAB PROGRAM                  | FOOD PRODUCTION (IN SPACE)        |      | O RING SEALS                        |
| ...STARPROBE MISSION               | PROVISIONING                      |      | REUSABLE SPACECRAFT                 |
| ...SURVEYOR PROJECT                | STOWAGE (ONBOARD EQUIPMENT)       |      | SPACE SHUTTLE ASCENT STAGE          |
| ...SYNCHRONOUS COMMUNICATIONS      |                                   |      |                                     |
| ...SATELLITE PROJ                  | SPACE RENDEZVOUS                  |      | SPACE SHUTTLE MAIN ENGINE           |
| ...TEKTIITE PROJECT                | 3006 3007                         |      | 2804                                |
| ...TIROS PROJECT                   | UF SPACECRAFT RENDEZVOUS          | GS   | ENGINES                             |
| ...TITAN PROJECT                   | GS RENDEZVOUS                     |      | .ROCKET ENGINES                     |
| ...VANGUARD PROJECT                | #SPACE RENDEZVOUS                 |      | ..LIQUID PROPELLANT ROCKET ENGINES  |
| ...VOYAGER PROJECT                 | ...ORBITAL RENDEZVOUS             | RT   | ..#SPACE SHUTTLE MAIN ENGINE        |
| ...NEW ZEALAND SPACE PROGRAM       | ...EARTH ORBITAL RENDEZVOUS       |      | PROPULSION                          |
| ...PAKISTAN SPACE PROGRAM          | ...LUNAR ORBITAL RENDEZVOUS       |      | SPACE TRANSPORTATION SYSTEM         |
| ...SAUDI ARABIAN SPACE PROGRAM     | APOLLO SOYUZ TEST PROJECT         |      | SPACE TRANSPORTATION SYSTEM FLIGHTS |
| RT                                 | RENDEZVOUS TRAJECTORIES           |      |                                     |
| APOLLO SOYUZ TEST PROJECT          | SPACECRAFT DOCKING                |      | SPACE SHUTTLE MISSION 31-A          |
| EUROPEAN SPACE AGENCY              | TRANSFER ORBITS                   | 3107 | GS                                  |
| INTERNATIONAL SPACE YEAR           |                                   |      | SPACE FLIGHT                        |
| ISRO                               | SPACE SCIENCES                    |      | .MANNED SPACE FLIGHT                |
| MANNED SPACE FLIGHT                | USE AEROSPACE SCIENCES            |      | ..SPACE SHUTTLE MISSIONS            |
| NASA PROGRAMS                      |                                   |      | ..#SPACE SHUTTLE MISSION 31-A       |
| % RESEARCH PROJECTS                | SPACE SELF MANEUVERING UNITS      | RT   | COLUMBIA (ORBITER)                  |
| SOLAR MAXIMUM MISSION              | USE SELF MANEUVERING UNITS        |      |                                     |
| SPACE MISSIONS                     |                                   |      | SPACE SHUTTLE MISSION 31-B          |
| SPACE PSYCHOLOGY                   | SPACE SHUTTLE ASCENT STAGE        | 3107 | GS                                  |
| 0408                               | 3103 3104 3105 3107               |      | SPACE FLIGHT                        |
| GS                                 | GS SPACECRAFT CONFIGURATIONS      |      | .MANNED SPACE FLIGHT                |
| AEROSPACE MEDICINE                 | #SPACE SHUTTLE ASCENT STAGE       |      | ..SPACE SHUTTLE MISSIONS            |
| #SPACE PSYCHOLOGY                  | ADVANCED SOLID ROCKET MOTOR (STS) | RT   | ..#SPACE SHUTTLE MISSION 31-B       |
| PSYCHOLOGY                         | ASCENT PROPULSION SYSTEMS         |      | CHALLENGER (ORBITER)                |
| #SPACE PSYCHOLOGY                  | EXTERNAL TANKS                    |      |                                     |
| ASTRONAUT PERFORMANCE              | SPACE SHUTTLE BOOSTERS            |      | SPACE SHUTTLE MISSION 31-C          |
| ASTRONAUT TRAINING                 | SPACE SHUTTLE ORBITERS            | 3107 | UF                                  |
| AVIATION PSYCHOLOGY                | SPACE SHUTTLE UPPER STAGES        |      | SPACE SHUTTLE ORBITAL FLIGHT 7      |
| MANNED SPACE FLIGHT                | SPACE SHUTTLES                    | GS   | SPACE FLIGHT                        |
| MILITARY PSYCHOLOGY                | STAGE SEPARATION                  |      | .MANNED SPACE FLIGHT                |
| PSYCHOLOGICAL EFFECTS              |                                   |      | ..SPACE SHUTTLE MISSIONS            |
| PSYCHOLOGICAL FACTORS              | SPACE SHUTTLE BOOSTERS            |      | ..SPACE SHUTTLE MISSION 31-C        |
| SOCIAL FACTORS                     | 3104 3105 3110 3409 0205          | RT   | CHALLENGER (ORBITER)                |
| SPACE ADAPTATION SYNDROME          | UF SHUTTLE BOOSTERS               |      |                                     |
| SPACE FLIGHT STRESS                | SOLID ROCKET BOOSTERS (SPACE      |      | SPACE SHUTTLE MISSION31-D           |

# NASA THESAURUS HIERARCHICAL UPDATE

|      |                               |                                |                            |                               |                               |
|------|-------------------------------|--------------------------------|----------------------------|-------------------------------|-------------------------------|
| 3107 | UF                            | SPACE SHUTTLE ORBITAL FLIGHT 8 | RT                         | DISCOVERY (ORBITER)           | ..SPACE SHUTTLE MISSIONS      |
| GS   | SPACE FLIGHT                  |                                | SPACE SHUTTLE MISSION 51-B | 3107                          | RT ATLANTIS (ORBITER)         |
|      | .MANNED SPACE FLIGHT          |                                | GS                         | SPACE FLIGHT                  | SPACE SHUTTLE MISSION 51-I    |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | .MANNED SPACE FLIGHT          | 3107                          |
|      | ..#SPACE SHUTTLE MISSION 31-D |                                |                            | ..SPACE SHUTTLE MISSIONS      | GS                            |
| RT   | CHALLENGER (ORBITER)          |                                | RT                         | CHALLENGER (ORBITER)          | ..SPACE SHUTTLE MISSIONS      |
|      |                               |                                |                            | ..#SPACE SHUTTLE MISSION 51-B | ..SPACE SHUTTLE MISSION 51-I  |
|      | SPACE SHUTTLE MISSION 41-A    |                                |                            | RT                            | DISCOVERY (ORBITER)           |
| 3107 | UF                            | SPACE SHUTTLE ORBITAL FLIGHT 9 | SPACE SHUTTLE MISSION 51-C | 3107                          | SPACE SHUTTLE MISSION 51-J    |
| GS   | SPACE FLIGHT                  |                                | GS                         | SPACE FLIGHT                  | 3107                          |
|      | .MANNED SPACE FLIGHT          |                                |                            | .MANNED SPACE FLIGHT          | GS                            |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | ..SPACE SHUTTLE MISSIONS      | SPACE FLIGHT                  |
|      | ..#SPACE SHUTTLE MISSION 41-A |                                |                            | ..#SPACE SHUTTLE MISSION 51-C | .MANNED SPACE FLIGHT          |
| RT   | COLUMBIA (ORBITER)            |                                | RT                         | DISCOVERY (ORBITER)           | ..SPACE SHUTTLE MISSIONS      |
|      |                               |                                |                            | ..#SPACE SHUTTLE MISSION 51-D | ..#SPACE SHUTTLE MISSION 51-J |
|      | SPACE SHUTTLE MISSION 41-B    |                                | SPACE SHUTTLE MISSION 51-D | 3107                          | RT ATLANTIS (ORBITER)         |
| 3107 | GS                            | SPACE FLIGHT                   | GS                         | SPACE FLIGHT                  | SPACE SHUTTLE MISSION 51-L    |
|      | .MANNED SPACE FLIGHT          |                                |                            | .MANNED SPACE FLIGHT          | 3107                          |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | ..SPACE SHUTTLE MISSIONS      | GS                            |
|      | ..#SPACE SHUTTLE MISSION 41-B |                                |                            | ..#SPACE SHUTTLE MISSION 51-D | SPACE FLIGHT                  |
| RT   | CHALLENGER (ORBITER)          |                                | RT                         | DISCOVERY (ORBITER)           | .MANNED SPACE FLIGHT          |
|      |                               |                                |                            | ..SPACE SHUTTLE MISSION 51-E  | ..SPACE SHUTTLE MISSIONS      |
|      | SPACE SHUTTLE MISSION 41-C    |                                | SPACE SHUTTLE MISSION 51-E | 3107                          | ..#SPACE SHUTTLE MISSION 51-L |
| 3107 | GS                            | SPACE FLIGHT                   | GS                         | SPACE FLIGHT                  | RT CHALLENGER (ORBITER)       |
|      | .MANNED SPACE FLIGHT          |                                |                            | .MANNED SPACE FLIGHT          | SPACE SHUTTLE MISSION 61-A    |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | ..SPACE SHUTTLE MISSIONS      | 3107                          |
|      | ..#SPACE SHUTTLE MISSION 41-C |                                |                            | ..#SPACE SHUTTLE MISSION 51-E | GS                            |
| RT   | CHALLENGER (ORBITER)          |                                | RT                         | CHALLENGER (ORBITER)          | .MANNED SPACE FLIGHT          |
|      |                               |                                |                            | ..SPACE SHUTTLE MISSION 51-F  | ..SPACE SHUTTLE MISSIONS      |
|      | SPACE SHUTTLE MISSION 41-D    |                                | SPACE SHUTTLE MISSION 51-F | 3107                          | ..#SPACE SHUTTLE MISSION 61-A |
| 3107 | GS                            | SPACE FLIGHT                   | GS                         | SPACE FLIGHT                  | CHALLENGER (ORBITER)          |
|      | .MANNED SPACE FLIGHT          |                                |                            | .MANNED SPACE FLIGHT          | COLUMBIA (ORBITER)            |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | ..SPACE SHUTTLE MISSIONS      | SPACE SHUTTLE MISSION 61-B    |
|      | ..#SPACE SHUTTLE MISSION 41-D |                                |                            | ..#SPACE SHUTTLE MISSION 51-F | 3107                          |
| RT   | DISCOVERY (ORBITER)           |                                | RT                         | CHALLENGER (ORBITER)          | GS                            |
|      |                               |                                |                            | ..SPACE SHUTTLE MISSION 51-G  | .MANNED SPACE FLIGHT          |
|      | SPACE SHUTTLE MISSION 41-G    |                                | SPACE SHUTTLE MISSION 51-G | 3107                          | ..SPACE SHUTTLE MISSIONS      |
| 3107 | GS                            | SPACE FLIGHT                   | GS                         | SPACE FLIGHT                  | ..#SPACE SHUTTLE MISSION 61-B |
|      | .MANNED SPACE FLIGHT          |                                |                            | .MANNED SPACE FLIGHT          | RT ATLANTIS (ORBITER)         |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | ..SPACE SHUTTLE MISSIONS      | SPACE SHUTTLE MISSION 61-C    |
|      | ..#SPACE SHUTTLE MISSION 41-G |                                |                            | ..#SPACE SHUTTLE MISSION 51-G | 3107                          |
| RT   | CHALLENGER (ORBITER)          |                                | RT                         | DISCOVERY (ORBITER)           | GS                            |
|      |                               |                                |                            | SAUDI ARABIAN SPACE PROGRAM   | SPACE FLIGHT                  |
|      | SPACE SHUTTLE MISSION 51-A    |                                | SPACE SHUTTLE MISSION 51-H | 3107                          | .MANNED SPACE FLIGHT          |
| 3107 | GS                            | SPACE FLIGHT                   | GS                         | SPACE FLIGHT                  | ..SPACE SHUTTLE MISSIONS      |
|      | .MANNED SPACE FLIGHT          |                                |                            | .MANNED SPACE FLIGHT          | ..#SPACE SHUTTLE MISSION 61-C |
|      | ..SPACE SHUTTLE MISSIONS      |                                |                            | ..SPACE SHUTTLE MISSIONS      | RT COLUMBIA (ORBITER)         |
|      | ..#SPACE SHUTTLE MISSION 51-A |                                |                            | ..SPACE SHUTTLE MISSION 61-E  | SPACE SHUTTLE MISSION 61-E    |
| RT   | CHALLENGER (ORBITER)          |                                | SPACE SHUTTLE MISSION 61-E | 3107                          |                               |

|                                     |                             |      |
|-------------------------------------|-----------------------------|------|
| GS                                  | SPACE FLIGHT                |      |
|                                     | .MANNED SPACE FLIGHT        |      |
|                                     | ..SPACE SHUTTLE MISSIONS    |      |
|                                     | ..#SPACE SHUTTLE MISSION    | 61-E |
| RT                                  | COLUMBIA (ORBITER)          |      |
| SPACE SHUTTLE MISSIONS              |                             |      |
| 3107                                |                             |      |
| GS                                  | SPACE FLIGHT                |      |
|                                     | .MANNED SPACE FLIGHT        |      |
|                                     | ..SPACE SHUTTLE MISSIONS    |      |
|                                     | ...SPACE SHUTTLE MISSION    | 31-A |
|                                     | ...SPACE SHUTTLE MISSION    | 31-B |
|                                     | ...SPACE SHUTTLE MISSION    | 31-C |
|                                     | ...SPACE SHUTTLE MISSION    | 31-D |
|                                     | ...SPACE SHUTTLE MISSION    | 41-A |
|                                     | ...SPACE SHUTTLE MISSION    | 41-B |
|                                     | ...SPACE SHUTTLE MISSION    | 41-C |
|                                     | ...SPACE SHUTTLE MISSION    | 41-D |
|                                     | ...SPACE SHUTTLE MISSION    | 41-G |
|                                     | ...SPACE SHUTTLE MISSION    | 51-A |
|                                     | ...SPACE SHUTTLE MISSION    | 51-B |
|                                     | ...SPACE SHUTTLE MISSION    | 51-C |
|                                     | ...SPACE SHUTTLE MISSION    | 51-D |
|                                     | ...SPACE SHUTTLE MISSION    | 51-E |
|                                     | ...SPACE SHUTTLE MISSION    | 51-F |
|                                     | ...SPACE SHUTTLE MISSION    | 51-G |
|                                     | ...SPACE SHUTTLE MISSION    | 51-H |
|                                     | ...SPACE SHUTTLE MISSION    | 51-I |
|                                     | ...SPACE SHUTTLE MISSION    | 51-J |
|                                     | ...SPACE SHUTTLE MISSION    | 51-L |
|                                     | ...SPACE SHUTTLE MISSION    | 61-A |
|                                     | ...SPACE SHUTTLE MISSION    | 61-B |
|                                     | ...SPACE SHUTTLE MISSION    | 61-C |
|                                     | ...SPACE SHUTTLE MISSION    | 61-E |
| RT                                  | GET AWAY SPECIALS (STS)     |      |
|                                     | % MISSIONS                  |      |
|                                     | SPACE MISSIONS              |      |
|                                     | SPACE TRANSPORTATION SYSTEM |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 1 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 1    |
|                                     | FLIGHT                      |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 2 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 2    |
|                                     | FLIGHT                      |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 3 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 3    |
|                                     | FLIGHT                      |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 4 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 4    |
|                                     | FLIGHT                      |      |

[illegible]

|                                     |                             |      |
|-------------------------------------|-----------------------------|------|
| GS                                  | SPACE FLIGHT                |      |
|                                     | .MANNED SPACE FLIGHT        |      |
|                                     | ..SPACE SHUTTLE MISSIONS    |      |
|                                     | ..#SPACE SHUTTLE MISSION    | 61-E |
| RT                                  | COLUMBIA (ORBITER)          |      |
| SPACE SHUTTLE MISSIONS              |                             |      |
| 3107                                |                             |      |
| GS                                  | SPACE FLIGHT                |      |
|                                     | .MANNED SPACE FLIGHT        |      |
|                                     | ..SPACE SHUTTLE MISSIONS    |      |
|                                     | ...SPACE SHUTTLE MISSION    | 31-A |
|                                     | ...SPACE SHUTTLE MISSION    | 31-B |
|                                     | ...SPACE SHUTTLE MISSION    | 31-C |
|                                     | ...SPACE SHUTTLE MISSION    | 31-D |
|                                     | ...SPACE SHUTTLE MISSION    | 41-A |
|                                     | ...SPACE SHUTTLE MISSION    | 41-B |
|                                     | ...SPACE SHUTTLE MISSION    | 41-C |
|                                     | ...SPACE SHUTTLE MISSION    | 41-D |
|                                     | ...SPACE SHUTTLE MISSION    | 41-G |
|                                     | ...SPACE SHUTTLE MISSION    | 51-A |
|                                     | ...SPACE SHUTTLE MISSION    | 51-B |
|                                     | ...SPACE SHUTTLE MISSION    | 51-C |
|                                     | ...SPACE SHUTTLE MISSION    | 51-D |
|                                     | ...SPACE SHUTTLE MISSION    | 51-E |
|                                     | ...SPACE SHUTTLE MISSION    | 51-F |
|                                     | ...SPACE SHUTTLE MISSION    | 51-G |
|                                     | ...SPACE SHUTTLE MISSION    | 51-H |
|                                     | ...SPACE SHUTTLE MISSION    | 51-I |
|                                     | ...SPACE SHUTTLE MISSION    | 51-J |
|                                     | ...SPACE SHUTTLE MISSION    | 51-L |
|                                     | ...SPACE SHUTTLE MISSION    | 61-A |
|                                     | ...SPACE SHUTTLE MISSION    | 61-B |
|                                     | ...SPACE SHUTTLE MISSION    | 61-C |
|                                     | ...SPACE SHUTTLE MISSION    | 61-E |
| RT                                  | GET AWAY SPECIALS (STS)     |      |
|                                     | % MISSIONS                  |      |
|                                     | SPACE MISSIONS              |      |
|                                     | SPACE TRANSPORTATION SYSTEM |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 1 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 1    |
|                                     | FLIGHT                      |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 2 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 2    |
|                                     | FLIGHT                      |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 3 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 3    |
|                                     | FLIGHT                      |      |
| SPACE SHUTTLE ORBITAL FLIGHT TEST 4 |                             |      |
| USE                                 | SPACE TRANSPORTATION SYSTEM | 4    |
|                                     | FLIGHT                      |      |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

RT #SPACE SHUTTLE UPPER STAGE A  
ATLAS CENTAUR LAUNCH VEHICLE

SPACE SHUTTLE UPPER STAGE D  
3104  
UF SSUS-D  
GS SPACE SHUTTLE UPPER STAGES  
#SPACE SHUTTLE UPPER STAGE D  
RT DELTA LAUNCH VEHICLE  
SOLID PROPELLANT ROCKET ENGINES  
SPIN STABILIZATION

SPACE SHUTTLE UPPER STAGES  
3107  
GS #SPACE SHUTTLE UPPER STAGES  
.SPACE SHUTTLE UPPER STAGE A  
.SPACE SHUTTLE UPPER STAGE D  
.SPINNING SOLID UPPER STAGE  
RT SPACE SHUTTLE ASCENT STAGE

SPACE SHUTTLES  
3104 3105 3110 3409 0205  
GS MANNED SPACECRAFT  
#SPACE SHUTTLES  
..BURAN SPACE SHUTTLE  
..HERMES MANNED SPACEPLANE  
REENTRY VEHICLES  
..RECOVERABLE SPACECRAFT  
..REUSABLE SPACECRAFT  
..#SPACE SHUTTLES  
....BURAN SPACE SHUTTLE  
....HERMES MANNED SPACEPLANE  
ADVANCED LAUNCH SYSTEM (STS)  
RT AEPS  
AEROMANEUVERING ORBIT TO ORBIT  
SHUTTLE  
ANNULAR SUSPENSION AND POINTING  
SYSTEM  
APPROACH AND LANDING TESTS (STS)  
ASSESS PROGRAM  
AUXILIARY PROPULSION  
BESS (SATELLITE)  
COLUMBUS SPACE STATION  
ENTRY GUIDANCE (STS)  
EURECA (ESA)  
EXPENDABLE STAGES (SPACECRAFT)  
GERMAN INFRARED LABORATORY  
HOTOL LAUNCH VEHICLE  
INERTIAL UPPER STAGE  
INTERIM STAGES (SPACECRAFT)  
INTRAORBIT TRANSFER VEHICLES  
LIRTS (TELESCOPE)  
MANNED SPACE FLIGHT  
ORBIT MANEUVERING ENGINE (SPACE  
SHUTTLE)

ORBIT TRANSFER VEHICLES  
ORBITAL MANEUVERS  
PAYLOAD CONTROL  
PAYLOAD DEPLOYMENT & RETRIEVAL  
SYSTEM  
PAYLOAD RETRIEVAL (STS)  
SAIL PROJECT  
SHUTTLE DERIVED VEHICLES  
SHUTTLE ENGINEERING SIMULATOR  
SHUTTLE PALLET SATELLITES  
SINGLE STAGE TO ORBIT VEHICLES  
SORTIE SYSTEMS  
SPACE SHUTTLE ASCENT STAGE  
SPACE TRANSPORTATION SYSTEM  
SPACE TRANSPORTATION SYSTEM FLIGHTS  
%  
SPACECRAFT  
SPACECRAFT RECOVERY  
SPACELAB

SPACE SIMULATORS  
0502 1107  
UF ORBITAL SIMULATORS  
GS SIMULATORS  
..ENVIRONMENT SIMULATORS  
..#SPACE SIMULATORS  
...HIGH VACUUM ORBITAL SIMULATOR  
...LANGLEY COMPLEX COORDINATOR  
CENTRIFUGES  
RT FLIGHT SIMULATORS  
NEUTRAL BUOYANCY SIMULATION  
SOLAR SIMULATORS  
SPACECRAFT ENVIRONMENTS  
VACUUM CHAMBERS

SPACE STATION FREEDOM  
3109  
UF FREEDOM SPACE STATION  
GS ARTIFICIAL SATELLITES  
.SPACE STATIONS  
..#SPACE STATION FREEDOM  
STATIONS  
.SPACE STATIONS  
..#SPACE STATION FREEDOM  
COLUMBUS SPACE STATION  
LARGE SPACE STRUCTURES  
NASA SPACE PROGRAMS  
ORBITAL SERVICING  
SPACE LABORATORIES  
SPACE PLATFORMS  
SPACE STATION PAYLOADS  
SPACE STATION POLAR PLATFORMS  
SPACE STATION POWER SUPPLIES  
SPACE STATION PROPULSION  
SPACE STATION STRUCTURES

SPACE STATION PAYLOADS  
3009 3104 3109 3110 3409  
GS PAYLOADS  
#SPACE STATION PAYLOADS  
RT EARTH OBSERVING SYSTEM (EOS)  
MAN TENDED FREE FLYERS  
SPACE SHUTTLE PAYLOADS  
SPACE STATION FREEDOM  
SPACE STATION POLAR PLATFORMS  
SPACE STATIONS  
SPACELAB PAYLOADS

SPACE STATION POLAR PLATFORMS  
3109  
UF POLAR PLATFORMS (SPACE STATIONS)  
GS ARTIFICIAL SATELLITES  
.SPACE STATIONS  
..#SPACE STATION POLAR PLATFORMS  
SPACE PLATFORMS  
#SPACE STATION POLAR PLATFORMS  
STATIONS  
.SPACE STATIONS  
..#SPACE STATION POLAR PLATFORMS  
COLUMBUS SPACE STATION  
EARTH OBSERVING SYSTEM (EOS)  
POLAR ORBITS  
REMOTE SENSING  
SPACE STATION FREEDOM  
SPACE STATION PAYLOADS

SPACE STATION POWER SUPPLIES  
2702 2808 3110  
GS ELECTRIC POWER SUPPLIES  
#SPACE STATION POWER SUPPLIES  
RT ELECTRIC BATTERIES  
ENERGY STORAGE  
SOLAR ARRAYS  
SOLAR CELLS  
SOLAR DYNAMIC POWER SYSTEMS  
SPACE POWER REACTORS  
SPACE STATION FREEDOM  
SPACE STATIONS  
SPACECRAFT POWER SUPPLIES  
THERMOELECTRIC GENERATORS

SPACE STATION PROPULSION  
2702 2808 3110  
GS PROPULSION  
#SPACE STATION PROPULSION  
RT AUXILIARY PROPULSION  
ELECTRIC PROPULSION  
HYDROGEN OXYGEN ENGINES  
ION ENGINES  
LOW THRUST PROPULSION  
PROPULSION SYSTEM CONFIGURATIONS



# NASA THESAURUS HIERARCHICAL UPDATE

RT LOW GRAVITY MANUFACTURING  
ORBITAL WORKERS  
TELEROBOTICS

SPACE TRANSPORTATION  
3110 3409  
GS TRANSPORTATION  
#SPACE TRANSPORTATION  
..SPACE TRANSPORTATION SYSTEM  
...ADVANCED LAUNCH SYSTEM (STS)  
HOTOL LAUNCH VEHICLE  
INERTIAL UPPER STAGE  
JAPANESE SPACE PROGRAM  
ORBIT TRANSFER VEHICLES  
PAYLOAD STATIONS  
PAYLOADS  
SINGLE STAGE TO ORBIT VEHICLES  
TERMINAL AREA ENERGY MANAGEMENT

SPACE TRANSPORTATION SYSTEM  
3107  
UF STS  
GS TRANSPORTATION  
..SPACE TRANSPORTATION  
#SPACE TRANSPORTATION SYSTEM  
...ADVANCED LAUNCH SYSTEM (STS)  
ADVANCED SOLID ROCKET MOTOR (STS)  
ANNULAR SUSPENSION AND POINTING  
SYSTEM  
APPROACH AND LANDING TESTS (STS)  
ATMOSPHERIC GENERAL CIRCULATION  
EXPERIMENT

DEFENSE PROGRAM  
EXTRAVEHICULAR MOBILITY UNITS  
HERMES MANNED SPACEPLANE  
INERTIAL UPPER STAGE  
MANNED MANEUVERING UNITS

NASA PROGRAMS  
ORBITAL SERVICING  
OSTA-1 PAYLOAD  
OSTA-1 PAYLOAD  
OSTA-2 PAYLOAD  
OSTA-3 PAYLOAD  
PAYLOAD ASSIST MODULE  
PAYLOAD DELIVERY (STS)  
PAYLOAD INTEGRATION PLAN  
PAYLOAD RETRIEVAL (STS)  
POWER MODULES (STS)  
REMOTE MANIPULATOR SYSTEM  
SPACE SHUTTLE MAIN ENGINE  
SPACE SHUTTLE MISSIONS  
SPACE SHUTTLE ORBITERS  
SPACE SHUTTLE PAYLOADS  
SPACE SHUTTLES

SPACE TRANSPORTATION SYSTEM FLIGHTS

SPACE TUGS  
SPACELAB  
% SYSTEMS

SPACE TRANSPORTATION SYSTEM FLIGHTS  
3107  
UF  
OFT  
ORBITAL FLIGHT TESTS (SHUTTLE)  
SPACE SHUTTLE ORBITAL FLIGHT TESTS  
SPACE SHUTTLE ORBITAL FLIGHTS  
FLIGHT TESTS  
GS #SPACE TRANSPORTATION SYSTEM  
FLIGHTS  
..SPACE TRANSPORTATION SYSTEM 1  
FLIGHT  
..SPACE TRANSPORTATION SYSTEM 2  
FLIGHT  
..SPACE TRANSPORTATION SYSTEM 3  
FLIGHT  
..SPACE TRANSPORTATION SYSTEM 4  
FLIGHT

RT ENTRY GUIDANCE (STS)  
GEOPHYSICAL FLUID FLOW CELLS  
SOLAR CELL CALIBRATION FACILITY  
SPACE FLIGHT  
SPACE SHUTTLE MAIN ENGINE  
SPACE SHUTTLES  
SPACE TRANSPORTATION SYSTEM  
% SYSTEMS  
% TESTS

SPACE TRANSPORTATION SYSTEM 1 FLIGHT  
3107  
UF  
OFT 1  
ORBITAL FLIGHT TEST 1 (SHUTTLE)  
SPACE SHUTTLE ORBITAL FLIGHT TEST 1  
STS-1  
GS FLIGHT TESTS  
..SPACE TRANSPORTATION SYSTEM  
FLIGHTS  
..SPACE TRANSPORTATION SYSTEM 1  
FLIGHT

SPACE TRANSPORTATION SYSTEM 2 FLIGHT  
3107  
UF  
OFT 2  
ORBITAL FLIGHT TEST 2 (SHUTTLE)  
SPACE SHUTTLE ORBITAL FLIGHT TEST 2  
STS-2  
GS FLIGHT TESTS  
..SPACE TRANSPORTATION SYSTEM  
FLIGHTS  
..SPACE TRANSPORTATION SYSTEM 2  
FLIGHT

SPACE TRANSPORTATION SYSTEM 3 FLIGHT  
3107  
UF  
OFT 3  
ORBITAL FLIGHT TEST 3 (SHUTTLE)  
SPACE SHUTTLE ORBITAL FLIGHT TEST 3  
STS-3  
GS FLIGHT TESTS  
..SPACE TRANSPORTATION SYSTEM  
FLIGHTS  
..SPACE TRANSPORTATION SYSTEM 3  
FLIGHT

SPACE TRANSPORTATION SYSTEM 3 FLIGHT  
3107  
UF  
OFT 3  
ORBITAL FLIGHT TEST 3 (SHUTTLE)  
SPACE SHUTTLE ORBITAL FLIGHT TEST 3  
STS-3  
GS FLIGHT TESTS  
..SPACE TRANSPORTATION SYSTEM  
FLIGHTS  
..SPACE TRANSPORTATION SYSTEM 3  
FLIGHT

SPACE TRANSPORTATION SYSTEM 4 FLIGHT  
3107  
UF  
OFT 4  
ORBITAL FLIGHT TEST 4 (SHUTTLE)  
SPACE SHUTTLE ORBITAL FLIGHT TEST 4  
STS-4  
GS FLIGHT TESTS  
..SPACE TRANSPORTATION SYSTEM  
FLIGHTS  
..SPACE TRANSPORTATION SYSTEM 4  
FLIGHT

SPACE TUGS  
2804 3110  
RT INERTIAL UPPER STAGE  
MODULES  
ORBIT TRANSFER VEHICLES  
ORBITAL SERVICING  
PAYLOADS  
PROPULSION  
SPACE TRANSPORTATION SYSTEM  
SPACECRAFT PROPULSION

SPACE VEHICLE CHECKOUT PROGRAM  
1102 1104 1108 3110  
UF SPACECRAFT PRELAUNCH TESTS  
RT CHECKOUT  
COUNTDOWN  
PERFORMANCE TESTS  
PREFIRING TESTS  
SPACECRAFT MAINTENANCE  
% TESTS

SPACE VEHICLE CONTROL  
USE SPACECRAFT CONTROL  
SPACE VEHICLES  
USE SPACECRAFT  
SPACE WEAPONS  
3101 3401  
GS WEAPONS  
#SPACE WEAPONS

## NASA THESAURUS HIERARCHICAL UPDATE

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | AIR TO AIR MISSILES<br>ANTIMISSILE MISSILES<br>CHAPARRAL MISSILE<br>LASER WEAPONS<br>MINUTEMAN ICBM<br>NUCLEAR WEAPONS<br>SURFACE TO AIR MISSILES<br>WEAPON SYSTEMS<br>WEAPONS DELIVERY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|    | SPACE-TIME CONTINUUM<br>USE RELATIVITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|    | SPACE-TIME FUNCTIONS<br>1902 2308<br>UF SPACE-TIME METRIC<br>GS #FUNCTIONS (MATHEMATICS)<br>#SPACE-TIME FUNCTIONS<br>LIGHT-CONE EXPANSION<br>MINKOWSKI SPACE<br>NAKED SINGULARITIES<br>RELATIVITY<br>YANG-MILLS THEORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|    | SPACE-TIME METRIC<br>USE SPACE-TIME FUNCTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    | SPACEBORNE ASTRONOMY<br>3001<br>GS ASTRONOMY<br>#SPACEBORNE ASTRONOMY<br>ASTRO MISSIONS (STS)<br>ASTRONOMICAL INTERFEROMETRY<br>ASTRONOMICAL SATELLITES<br>COSMIC BACKGROUND EXPLORER<br>SATELLITE<br>FAINT OBJECT CAMERA<br>GAMMA RAY OBSERVATORY<br>HIPPARCOS SATELLITE<br>HUBBLE SPACE TELESCOPE<br>INFRARED SPACE OBSERVATORY (ISO)                                                                                                                                                                                                                                                                                                                                                                        |
| RT | IUE<br>MAGELLAN ULTRAVIOLET ASTRONOMY<br>SATELLITE<br>PINHOLE OCCULTER FACILITY<br>QUASAR<br>ROSAT MISSION<br>SAS-2<br>SAS-3<br>SOFIA (AIRBORNE OBSERVATORY)<br>SPACE INFRARED TELESCOPE FACILITY<br>STARSAT TELESCOPE<br>TELESCOPES<br>ULTRAVIOLET TELESCOPES<br>X-RAY ASTROPHYSICS FACILITY                                                                                                                                                                                                                                                                                                                                                                                                                  |
|    | SPACEBORNE EXPERIMENTS<br>2802<br>GS #SPACEBORNE EXPERIMENTS<br>.ORBITING FROG OTOLITH<br>.PHYSICS AND CHEMISTRY EXPERIMENT<br>IN SPACE<br>.PLASMA INTERACTION EXPERIMENT<br>AEROSPACE ENVIRONMENTS<br>AMPTC (SATELLITES)<br>BIOPROCESSING<br>CRRES (SATELLITE)<br>EXPERIMENTATION<br>GEOPHYSICAL FLUID FLOW CELLS<br>GET AWAY SPECIALS (STS)<br>LONG DURATION EXPOSURE FACILITY<br>MAN TENDED FREE FLYERS<br>MOLECULAR SHIELDS<br>OSS-1 PAYLOAD<br>OSTA-1 PAYLOAD<br>OSTA-3 PAYLOAD<br>PAYLOAD ASSIST MODULE<br>PAYLOAD INTEGRATION PLAN<br>PAYLOADS<br>SPACE LABORATORIES<br>SPACE MANUFACTURING<br>SPACE PROCESSING<br>SPACE SHUTTLE PAYLOADS<br>SPACE TECHNOLOGY EXPERIMENTS<br>SPACELAB<br>WEIGHTLESSNESS |
|    | SPACEBORNE LASERS<br>1601<br>GS STIMULATED EMISSION DEVICES<br>.LASERS<br>.#SPACEBORNE LASERS<br>AIRBORNE LASERS<br>LASER APPLICATIONS<br>REMOTE SENSORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
| RT | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
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|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
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|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>AERIAL PHOTOGRAPHY<br>ASTRONOMICAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CLOUD PHOTOGRAPHS<br>CLOUD PHOTOGRAPHY                                                                                                                                                                                                                                                                                                                                                                    |
|    | SPACEBORNE PHOTOGRAPHY<br>1407 3001<br>UF SPACE PHOTOGRAPHY<br>GS IMAGERY<br>#SPACEBORNE PHOTOGRAPHY<br>..SATELLITE-BORNE PHOTOGRAPHY<br>PHOTO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



# NASA THESAURUS HIERARCHICAL UPDATE

CZECHOSLOVAKIAN SPACECRAFT  
 DISCOVERY (ORBITER)  
 DUAL SPIN SPACECRAFT  
 ENDEAVOUR (ORBITER)  
 ENTERPRISE (ORBITER)  
 ESA SPACECRAFT  
 ESCAPE ROCKETS  
 EXPANDABLE STRUCTURES  
 FLEXIBLE SPACECRAFT  
 FLIGHT TEST VEHICLES  
 FRENCH SPACE PROGRAM  
 GALILEO PROBE  
 GALILEO SPACECRAFT  
 GROUND SUPPORT EQUIPMENT  
 HYPERSONIC VEHICLES  
 INDIAN SPACE PROGRAM  
 INDIAN SPACECRAFT  
 INFLATABLE SPACECRAFT  
 INTERPLANETARY SPACECRAFT  
 ISRAELI SPACECRAFT  
 JAPANESE SPACE PROGRAM  
 JAPANESE SPACECRAFT  
 LAUNCH VEHICLES  
 LUNAR SPACECRAFT  
 MAGELLAN SPACECRAFT (NASA)  
 MANEUVERABLE SPACECRAFT  
 MANNED ORBITAL LABORATORIES  
 MANNED SPACECRAFT  
 MARINER MARK 2 SPACECRAFT  
 MARK 1 SPACECRAFT  
 MILITARY SPACECRAFT  
 ORBIT TRANSFER VEHICLES  
 ORBITAL MANEUVERING VEHICLES  
 ORBITING LUNAR STATIONS  
 OUTER PLANETS EXPLORERS  
 PHOTO RECONNAISSANCE SPACECRAFT  
 PIONEER VENUS 2 SPACECRAFT  
 POWER LIMITED SPACECRAFT  
 RADIATION METEOROID SPACECRAFT  
 RECOVERABLE SPACECRAFT  
 REENTRY VEHICLES  
 RESEARCH VEHICLES  
 SATELLITES  
 SERT 1 SPACECRAFT  
 SERT 2 SPACECRAFT  
 SHUTTLE DERIVED VEHICLES  
 SOFT LANDING SPACECRAFT  
 SOLAR MAXIMUM MISSION-A  
 SOLETTAS  
 SOVIET SPACECRAFT  
 SPACE CAPSULES  
 SPACE DEBRIS  
 SPACE LABORATORIES  
 SPACE MISSIONS  
 SPACE SHUTTLES

SPACECRAFT CABIN SIMULATORS  
 SPACECRAFT MODULES  
 TECHNOLOGY FEASIBILITY SPACECRAFT  
 TEST VEHICLES  
 TOPS (SPACECRAFT)  
 TRANSATMOSPHERIC VEHICLES  
 UNIDENTIFIED FLYING OBJECTS  
 UNMANNED SPACECRAFT  
 % VEHICLES  
 VIKING ORBITER SPACECRAFT  
 VIKING ORBITER 1  
 VIKING ORBITER 2  
 VOYAGER 1 SPACECRAFT  
 VOYAGER 2 SPACECRAFT  
 X-30 VEHICLE

SPACECRAFT ANTENNAS  
 0701 0901  
 GS ANTENNAS  
 #SPACECRAFT ANTENNAS  
 RADIO EQUIPMENT  
 #SPACECRAFT ANTENNAS  
 TELECOMMUNICATION  
 #SPACECRAFT ANTENNAS  
 FURLABLE ANTENNAS

SPACECRAFT BREAKUP  
 1301 1302 3105 3107 3110  
 UF BREAKUP (SPACECRAFT)  
 ORBITAL BREAKUP  
 REENTRY BREAKUP  
 SATELLITE BREAKUP  
 SATELLITE FRAGMENTATION  
 ATMOSPHERIC ENTRY  
 DESTRUCTION  
 HAZARDS  
 METEOROID HAZARDS  
 ORBIT DECAY  
 REENTRY EFFECTS  
 SPACE DEBRIS  
 SPACECRAFT REENTRY  
 SPACECRAFT SURVIVABILITY  
 UNCONTROLLED REENTRY (SPACECRAFT)  
 WRECKAGE

SPACECRAFT CABIN ATMOSPHERES  
 0504 0505 0507 1107 3104  
 GS CONTROLLED ATMOSPHERES  
 .CABIN ATMOSPHERES  
 .#SPACECRAFT CABIN ATMOSPHERES  
 CARBON DIOXIDE CONCENTRATION  
 CLOSED ECOLOGICAL SYSTEMS  
 COCKPITS  
 ENVIRONMENTAL CONTROL  
 HIGH PRESSURE OXYGEN

PRESSURIZED CABINS  
 REBREATHING  
 SPACECRAFT CABIN SIMULATORS  
 0504 0507 3104  
 GS SIMULATORS  
 .TRAINING SIMULATORS  
 .#SPACECRAFT CABIN SIMULATORS  
 AEROSPACE ENVIRONMENTS  
 COCKPIT SIMULATORS  
 MANNED SPACECRAFT  
 SIMULATION  
 SPACE FLIGHT TRAINING  
 SPACE LOGISTICS  
 % SPACECRAFT  
 TEST FACILITIES

SPACECRAFT CABINS  
 0504 0507 3104  
 GS COMPARTMENTS  
 #SPACECRAFT CABINS  
 SPACECRAFT COMPONENTS  
 #SPACECRAFT CABINS

RT % CABINS  
 COCKPITS  
 CREW EXPERIMENT STATIONS  
 CREW OBSERVATION STATIONS  
 CREW WORKSTATIONS  
 PRESSURIZED CABINS  
 SPACE CAPSULES

SPACECRAFT CHARGING  
 1301  
 RT ELECTRIC FIELDS  
 EXTERNAL SURFACE CURRENTS  
 SINGLE EVENT UPSETS  
 SPACECRAFT GLOW  
 SYSTEM GENERATED ELECTROMAGNETIC  
 PULSES

SPACECRAFT CHARGING AT HIGH ALTITUDE  
 USE SCATHA SATELLITE

SPACECRAFT COMMUNICATION  
 0705 0706 0707 3110  
 SN (COMMUNICATION OF SPACECRAFT WITH  
 GROUND OR OTHER SPACECRAFT)  
 GS TELECOMMUNICATION  
 .SPACE COMMUNICATION  
 .#SPACECRAFT COMMUNICATION  
 ...REENTRY COMMUNICATION  
 ...SATELLITE COMMUNICATION  
 ARPA COMPUTER NETWORK  
 ASTRONICS  
 CIRCUMLUNAR COMMUNICATION

|                                   |                                   |                                  |
|-----------------------------------|-----------------------------------|----------------------------------|
| EARTH TERMINALS                   | LAUNCH VEHICLE CONFIGURATIONS     | 0101 3110 3203 3404 4001         |
| FACSIMILE COMMUNICATION           | PROPULSION SYSTEM CONFIGURATIONS  | GS #SPACECRAFT DESIGN            |
| GROUND-AIR-GROUND COMMUNICATION   | RADIATION METEOROID SPACECRAFT    | .IPAD                            |
| HOOP COLUMN ANTENNAS              | REENTRY VEHICLES                  | .SATELLITE DESIGN                |
| INTERPLANETARY COMMUNICATION      | UPPER STAGE ROCKET ENGINES        | RT ADVANCED LAUNCH SYSTEM (STS)  |
| LUNAR COMMUNICATION               |                                   | COMPUTER AIDED DESIGN            |
| OPTICAL COMMUNICATION             | SPACECRAFT CONSTRUCTION MATERIALS | % DESIGN                         |
| PACKET TRANSMISSION               | 1701 1802 1805 3110               | ENGINE DESIGN                    |
| PLASMA ANTENNAS                   | RT % CONSTRUCTION MATERIALS       | HERMES MANNED SPACEPLANE         |
| RADIO COMMUNICATION               | FUNCTIONALLY GRADIENT MATERIALS   | INDIAN SPACE PROGRAM             |
| SATELLITE COMMUNICATIONS SHIPS    | LUDOX (TRADEMARK)                 | JAPANESE SPACE PROGRAM           |
| SATELLITE GROUND SUPPORT          | % MATERIALS                       | LOFTING                          |
| SINGLE CHANNEL PER CARRIER        | SPACECRAFT CONTAMINATION          | PRODUCT DEVELOPMENT              |
| TRANSMISSION                      | 0504 1102 3110                    | SATELLITE TEMPERATURE            |
| SYSTEM GENERATED ELECTROMAGNETIC  | GS CONTAMINATION                  | SHUTTLE DERIVED VEHICLES         |
| PULSES                            | #SPACECRAFT CONTAMINATION         | SPACE DEBRIS                     |
| UNIFIED S BAND                    | RT DECONTAMINATION                | SPACECRAFT TEMPERATURE           |
| WIRELESS COMMUNICATION            | EXOBIOLGY                         | STRUCTURAL DESIGN                |
|                                   |                                   | SYSTEMS ENGINEERING              |
|                                   |                                   | TRANSATMOSPHERIC VEHICLES        |
|                                   |                                   | WEIGHT REDUCTION                 |
| SPACECRAFT COMPONENTS             | SPACECRAFT CONTROL                |                                  |
| 3110                              | 0707 3006 3110 3502               | SPACECRAFT DOCKING               |
| GS                                | UF SPACE VEHICLE CONTROL          | 3110 3502                        |
| .SERVICE MODULES                  | GS #SPACECRAFT CONTROL            | UF DOCKING                       |
| .SPACECRAFT CABINS                | .SATELLITE CONTROL                | GS MANEUVERS                     |
| .SPACECRAFT DOCKING MODULES       | ..SATELLITE ATTITUDE CONTROL      | #SPACECRAFT DOCKING              |
| .SPACECRAFT MODULES               | RT ATTITUDE CONTROL               | RT % ASTRONAUTICS                |
| ..COMMAND MODULES                 | AUTOMATIC CONTROL                 | INTERCEPTION                     |
| ..COMMAND SERVICE MODULES         | % CONTROL                         | MIR SPACE STATION                |
| ..LANDING MODULES                 | CONTROL SIMULATION                | MOORING                          |
| ..LUNAR LANDING MODULES           | CREW PROCEDURES (PREFLIGHT)       | MULTIPLE DOCKING ADAPTERS        |
| ....LUNAR MODULE                  | ENGINE CONTROL                    | ORBITAL RENDEZVOUS               |
| ....LSSM                          | FLEXIBLE SPACECRAFT               | RENDEZVOUS TRAJECTORIES          |
| ...MARS EXCURSION MODULE          | FLIGHT CONTROL                    | SALYUT SPACE STATION             |
| ..SIM                             | FLY BY WIRE CONTROL               | SPACE RENDEZVOUS                 |
| RT AIRBORNE/SPACEBORNE COMPUTERS  | GROUND BASED CONTROL              | SPACE STATIONS                   |
| BORON-EPOXY COMPOSITES            | MANUAL CONTROL                    | TRANSFER ORBITS                  |
| COMMONALITY                       | MARQUARDT R4D ENGINE              |                                  |
| % COMPONENTS                      | MISSILE CONTROL                   |                                  |
| NOSE CONES                        | POINTING CONTROL SYSTEMS          |                                  |
| ROCKET ENGINES                    | RADIO CONTROL                     | SPACECRAFT DOCKING MODULES       |
|                                   | REMOTE CONTROL                    | 3110                             |
| SPACECRAFT COMPUTERS              | ROCKET ENGINE CONTROL             | GS MODULES                       |
| USE AIRBORNE/SPACEBORNE COMPUTERS | SHAPE CONTROL                     | #SPACECRAFT DOCKING MODULES      |
|                                   | STATIONKEEPING                    | SPACECRAFT COMPONENTS            |
|                                   | THRUST VECTOR CONTROL             | #SPACECRAFT DOCKING MODULES      |
|                                   | VISUAL CONTROL                    | RT AIRLOCK MODULES               |
|                                   |                                   | COMMAND MODULES                  |
|                                   |                                   | COMMAND SERVICE MODULES          |
|                                   |                                   | LANDING MODULES                  |
|                                   |                                   | SERVICE MODULES                  |
|                                   | SPACECRAFT DEFENSE                |                                  |
|                                   | 3401                              |                                  |
|                                   | UF SATELLITE DEFENSE              |                                  |
|                                   | RT SPACECRAFT SURVIVABILITY       |                                  |
|                                   | VULNERABILITY                     |                                  |
|                                   |                                   | SPACECRAFT ELECTRONIC EQUIPMENT  |
|                                   |                                   | 0905 1002 1410 3110              |
|                                   |                                   | GS ELECTRONIC EQUIPMENT          |
|                                   |                                   | #SPACECRAFT ELECTRONIC EQUIPMENT |

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|                                    |  |  |  |  |  |
|------------------------------------|--|--|--|--|--|
| ONBOARD EQUIPMENT                  |  |  |  |  |  |
| #SPACECRAFT EQUIPMENT              |  |  |  |  |  |
| #SPACECRAFT ELECTRONIC EQUIPMENT   |  |  |  |  |  |
| RT AIRBORNE/SPACEBORNE COMPUTERS   |  |  |  |  |  |
| ASTRONICS                          |  |  |  |  |  |
| SINGLE EVENT UPSETS                |  |  |  |  |  |
| SPACECRAFT ENVIRONMENTS            |  |  |  |  |  |
| 0504 0507 3110                     |  |  |  |  |  |
| SN (LIMITED TO SPACECRAFT INTERNAL |  |  |  |  |  |
| COMPARTMENTS AND CABINS: FOR       |  |  |  |  |  |
| SPACECRAFT EXTERNAL ENVIRONMENTS   |  |  |  |  |  |
| REFER TO 'EXTRATERRESTRIAL         |  |  |  |  |  |
| ENVIRONMENTS')                     |  |  |  |  |  |
| ENVIRONMENTS                       |  |  |  |  |  |
| #SPACECRAFT ENVIRONMENTS           |  |  |  |  |  |
| RT AEROSPACE MEDICINE              |  |  |  |  |  |
| BIOASTRONAUTICS                    |  |  |  |  |  |
| CLOSED ECOLOGICAL SYSTEMS          |  |  |  |  |  |
| CONTROLLED ATMOSPHERES             |  |  |  |  |  |
| ENVIRONMENTAL CONTROL              |  |  |  |  |  |
| EXOLOGY                            |  |  |  |  |  |
| EXTRATERRESTRIAL ENVIRONMENTS      |  |  |  |  |  |
| INTRAVEHICULAR ACTIVITY            |  |  |  |  |  |
| LIFE SUPPORT SYSTEMS               |  |  |  |  |  |
| ROTATING ENVIRONMENTS              |  |  |  |  |  |
| SATELLITE TEMPERATURE              |  |  |  |  |  |
| SPACE SIMULATORS                   |  |  |  |  |  |
| THERMAL ENVIRONMENTS               |  |  |  |  |  |
| WEIGHTLESSNESS                     |  |  |  |  |  |
| SPACECRAFT EQUIPMENT               |  |  |  |  |  |
| 3110                               |  |  |  |  |  |
| GS ONBOARD EQUIPMENT               |  |  |  |  |  |
| #SPACECRAFT EQUIPMENT              |  |  |  |  |  |
| #SPACECRAFT ELECTRONIC EQUIPMENT   |  |  |  |  |  |
| RT % EQUIPMENT                     |  |  |  |  |  |
| OSTA-3 PAYLOAD                     |  |  |  |  |  |
| SPACECRAFT INSTRUMENTS             |  |  |  |  |  |
| SPACECRAFT GLOW                    |  |  |  |  |  |
| 0603 0605 2306 2310 3110           |  |  |  |  |  |
| UF SHUTTLE GLOW                    |  |  |  |  |  |
| GS DECAY                           |  |  |  |  |  |
| #SPACECRAFT GLOW                   |  |  |  |  |  |
| EMISSION                           |  |  |  |  |  |
| .LIGHT EMISSION                    |  |  |  |  |  |
| ..LUMINESCENCE                     |  |  |  |  |  |
| ..#SPACECRAFT GLOW                 |  |  |  |  |  |
| RT EARTH ORBITAL ENVIRONMENTS      |  |  |  |  |  |
| SPACECRAFT CHARGING                |  |  |  |  |  |
| SURFACE REACTIONS                  |  |  |  |  |  |
| SPACECRAFT GUIDANCE                |  |  |  |  |  |
| 0707 1904 3006 3502                |  |  |  |  |  |
| GUIDANCE (MOTION)                  |  |  |  |  |  |
| #SPACECRAFT GUIDANCE               |  |  |  |  |  |
| ..SATELLITE GUIDANCE               |  |  |  |  |  |
| AUTOMATIC CONTROL                  |  |  |  |  |  |
| AUTONOMOUS NAVIGATION              |  |  |  |  |  |
| CCD STAR TRACKER                   |  |  |  |  |  |
| CELESTIAL NAVIGATION               |  |  |  |  |  |
| COMMAND GUIDANCE                   |  |  |  |  |  |
| GROUND BASED CONTROL               |  |  |  |  |  |
| INERTIAL GUIDANCE                  |  |  |  |  |  |
| INJECTION GUIDANCE                 |  |  |  |  |  |
| INTERPLANETARY FLIGHT              |  |  |  |  |  |
| INTERPLANETARY TRAJECTORIES        |  |  |  |  |  |
| LASER GYROSCOPES                   |  |  |  |  |  |
| MANUAL CONTROL                     |  |  |  |  |  |
| MIDCOURSE GUIDANCE                 |  |  |  |  |  |
| ORBITS                             |  |  |  |  |  |
| REENTRY GUIDANCE                   |  |  |  |  |  |
| RENDEZVOUS GUIDANCE                |  |  |  |  |  |
| SPACE FLIGHT                       |  |  |  |  |  |
| SPACE NAVIGATION                   |  |  |  |  |  |
| STAR TRACKERS                      |  |  |  |  |  |
| TERMINAL GUIDANCE                  |  |  |  |  |  |
| SPACECRAFT INSTRUMENTS             |  |  |  |  |  |
| 0902 1410 2802 3110                |  |  |  |  |  |
| UF SPACECRAFT SENSORS              |  |  |  |  |  |
| GS #SPACECRAFT INSTRUMENTS         |  |  |  |  |  |
| ..SATELLITE INSTRUMENTS            |  |  |  |  |  |
| ..MULTISPECTRAL LINEAR ARRAYS      |  |  |  |  |  |
| ..SPACECRAFT POSITION INDICATORS   |  |  |  |  |  |
| RT ASTRONICS                       |  |  |  |  |  |
| ATMOSPHERIC CLOUD PHYSICS LAB      |  |  |  |  |  |
| (SPACELAB)                         |  |  |  |  |  |
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| MEASURING INSTRUMENTS              |  |  |  |  |  |
| ONBOARD EQUIPMENT                  |  |  |  |  |  |
| SPACECRAFT EQUIPMENT               |  |  |  |  |  |
| SPACECRAFT LANDING                 |  |  |  |  |  |
| 3004 3007 3009 3110 3201           |  |  |  |  |  |
| GS LANDING                         |  |  |  |  |  |
| #SPACECRAFT LANDING                |  |  |  |  |  |
| ..HORIZONTAL SPACECRAFT LANDING    |  |  |  |  |  |
| ..LUNAR LANDING                    |  |  |  |  |  |
| ..MARS LANDING                     |  |  |  |  |  |
| ..PLANETARY LANDING                |  |  |  |  |  |
| GUIDANCE (MOTION)                  |  |  |  |  |  |
| #SPACECRAFT GUIDANCE               |  |  |  |  |  |
| ..SATELLITE GUIDANCE               |  |  |  |  |  |
| AUTOMATIC CONTROL                  |  |  |  |  |  |
| AUTONOMOUS NAVIGATION              |  |  |  |  |  |
| CCD STAR TRACKER                   |  |  |  |  |  |
| CELESTIAL NAVIGATION               |  |  |  |  |  |
| COMMAND GUIDANCE                   |  |  |  |  |  |
| GROUND BASED CONTROL               |  |  |  |  |  |
| INERTIAL GUIDANCE                  |  |  |  |  |  |
| INJECTION GUIDANCE                 |  |  |  |  |  |
| INTERPLANETARY FLIGHT              |  |  |  |  |  |
| INTERPLANETARY TRAJECTORIES        |  |  |  |  |  |
| LASER GYROSCOPES                   |  |  |  |  |  |
| MANUAL CONTROL                     |  |  |  |  |  |
| MIDCOURSE GUIDANCE                 |  |  |  |  |  |
| ORBITS                             |  |  |  |  |  |
| REENTRY GUIDANCE                   |  |  |  |  |  |
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| SPACE FLIGHT                       |  |  |  |  |  |
| SPACE NAVIGATION                   |  |  |  |  |  |
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| TERMINAL GUIDANCE                  |  |  |  |  |  |
| SPACECRAFT INSTRUMENTS             |  |  |  |  |  |
| 0902 1410 2802 3110                |  |  |  |  |  |
| UF SPACECRAFT SENSORS              |  |  |  |  |  |
| GS #SPACECRAFT INSTRUMENTS         |  |  |  |  |  |
| ..SATELLITE INSTRUMENTS            |  |  |  |  |  |
| ..MULTISPECTRAL LINEAR ARRAYS      |  |  |  |  |  |
| ..SPACECRAFT POSITION INDICATORS   |  |  |  |  |  |
| RT ASTRONICS                       |  |  |  |  |  |
| ATMOSPHERIC CLOUD PHYSICS LAB      |  |  |  |  |  |
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| AUTONOMOUS SPACECRAFT CLOCKS       |  |  |  |  |  |
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| SPACECRAFT EQUIPMENT               |  |  |  |  |  |
| SPACECRAFT LANDING                 |  |  |  |  |  |
| 3004 3007 3009 3110 3201           |  |  |  |  |  |
| GS LANDING                         |  |  |  |  |  |
| #SPACECRAFT LANDING                |  |  |  |  |  |
| ..HORIZONTAL SPACECRAFT LANDING    |  |  |  |  |  |
| ..LUNAR LANDING                    |  |  |  |  |  |
| ..MARS LANDING                     |  |  |  |  |  |
| ..PLANETARY LANDING                |  |  |  |  |  |
| GUIDANCE (MOTION)                  |  |  |  |  |  |
| #SPACECRAFT GUIDANCE               |  |  |  |  |  |
| ..SATELLITE GUIDANCE               |  |  |  |  |  |
| AUTOMATIC CONTROL                  |  |  |  |  |  |
| AUTONOMOUS NAVIGATION              |  |  |  |  |  |
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| SPACECRAFT LANDING                 |  |  |  |  |  |
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| #SPACECRAFT LANDING                |  |  |  |  |  |
| ..HORIZONTAL SPACECRAFT LANDING    |  |  |  |  |  |
| ..LUNAR LANDING                    |  |  |  |  |  |
| ..MARS LANDING                     |  |  |  |  |  |
| ..PLANETARY LANDING                |  |  |  |  |  |
| GUIDANCE (MOTION)                  |  |  |  |  |  |
| #SPACECRAFT GUIDANCE               |  |  |  |  |  |
| ..SATELLITE GUIDANCE               |  |  |  |  |  |
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| GS #SPACECRAFT INSTRUMENTS         |  |  |  |  |  |
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| ..SPACECRAFT POSITION INDICATORS   |  |  |  |  |  |
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| LASER ALTIMETERS                   |  |  |  |  |  |
| MEASURING INSTRUMENTS              |  |  |  |  |  |
| ONBOARD EQUIPMENT                  |  |  |  |  |  |
| SPACECRAFT EQUIPMENT               |  |  |  |  |  |
| SPACECRAFT LANDING                 |  |  |  |  |  |
| 3004 3007 3009 3110 3201           |  |  |  |  |  |
| GS LANDING                         |  |  |  |  |  |
| #SPACECRAFT LANDING                |  |  |  |  |  |
| ..HORIZONTAL SPACECRAFT LANDING    |  |  |  |  |  |
| ..LUNAR LANDING                    |  |  |  |  |  |
| ..MARS LANDING                     |  |  |  |  |  |
| ..PLANETARY LANDING                |  |  |  |  |  |
| GUIDANCE (MOTION)                  |  |  |  |  |  |
| #SPACECRAFT GUIDANCE               |  |  |  |  |  |
| ..SATELLITE GUIDANCE               |  |  |  |  |  |
| AUTOMATIC CONTROL                  |  |  |  |  |  |
| AUTONOMOUS NAVIGATION              |  |  |  |  |  |
| CCD STAR TRACKER                   |  |  |  |  |  |
| CELESTIAL NAVIGATION               |  |  |  |  |  |
| COMMAND GUIDANCE                   |  |  |  |  |  |
| GROUND BASED CONTROL               |  |  |  |  |  |
| INERTIAL GUIDANCE                  |  |  |  |  |  |
| INJECTION GUIDANCE                 |  |  |  |  |  |
| INTERPLANETARY FLIGHT              |  |  |  |  |  |
| INTERPLANETARY TRAJECTORIES        |  |  |  |  |  |
| LASER GYROSCOPES                   |  |  |  |  |  |
| MANUAL CONTROL                     |  |  |  |  |  |
| MIDCOURSE GUIDANCE                 |  |  |  |  |  |
| ORBITS                             |  |  |  |  |  |
| REENTRY GUIDANCE                   |  |  |  |  |  |
| RENDEZVOUS GUIDANCE                |  |  |  |  |  |
| SPACE FLIGHT                       |  |  |  |  |  |
| SPACE NAVIGATION                   |  |  |  |  |  |
| STAR TRACKERS                      |  |  |  |  |  |
| TERMINAL GUIDANCE                  |  |  |  |  |  |
| SPACECRAFT INSTRUMENTS             |  |  |  |  |  |
| 0902 1410 2802 3110                |  |  |  |  |  |
| UF SPACECRAFT SENSORS              |  |  |  |  |  |
| GS #SPACECRAFT INSTRUMENTS         |  |  |  |  |  |
| ..SATELLITE INSTRUMENTS            |  |  |  |  |  |
| ..MULTISPECTRAL LINEAR ARRAYS      |  |  |  |  |  |
| ..SPACECRAFT POSITION INDICATORS   |  |  |  |  |  |
| RT ASTRONICS                       |  |  |  |  |  |
| ATMOSPHERIC CLOUD PHYSICS LAB      |  |  |  |  |  |
| (SPACELAB)                         |  |  |  |  |  |
| AUTONOMOUS SPACECRAFT CLOCKS       |  |  |  |  |  |
| BUBBLE TECHNIQUE                   |  |  |  |  |  |
| FLIGHT INSTRUMENTS                 |  |  |  |  |  |
| FLIGHT TEST INSTRUMENTS            |  |  |  |  |  |
| GUIDANCE SENSORS                   |  |  |  |  |  |
| INSTRUMENT PACKAGES                |  |  |  |  |  |
| INSTRUMENTS                        |  |  |  |  |  |
| I2S CAMERAS                        |  |  |  |  |  |
| LASER ALTIMETERS                   |  |  |  |  |  |
| MEASURING INSTRUMENTS              |  |  |  |  |  |
| ONBOARD EQUIPMENT                  |  |  |  |  |  |
| SPACECRAFT EQUIPMENT               |  |  |  |  |  |
| SPACECRAFT LANDING                 |  |  |  |  |  |
| 3004 3007 3009 3110 3201           |  |  |  |  |  |
| GS LANDING                         |  |  |  |  |  |
| #SPACECRAFT LANDING                |  |  |  |  |  |
| ..HORIZONTAL SPACECRAFT LANDING    |  |  |  |  |  |
| ..LUNAR LANDING                    |  |  |  |  |  |
| ..MARS LANDING                     |  |  |  |  |  |
| ..PLANETARY LANDING                |  |  |  |  |  |

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# NASA THESAURUS HIERARCHICAL UPDATE

PROPELLANTS  
ROCKET ENGINES  
ROVER PROJECT  
SOLAR SAILS  
SPACE FLIGHT  
SPACE STATION PROPULSION  
SPACE TUGS

SPACECRAFT RADIATORS  
2806 2808 3110 3303  
UF SPACE RADIATORS  
GS HEAT RADIATORS  
#SPACECRAFT RADIATORS  
RT CONDENSERS (LIQUEFIERERS)  
COOLING  
COOLING SYSTEMS  
RADIATIVE HEAT TRANSFER  
SOLAR REFLECTORS

SPACECRAFT RECOVERY  
3110  
UF SATELLITE CAPTURE  
SNATCHING  
RT BOOSTER RECOVERY  
DISCOVERER RECOVERY CAPSULES  
RECOVERABLE SPACECRAFT  
% RECOVERY  
RECOVERY PARACHUTES  
RECOVERY ZONES  
RESCUE OPERATIONS  
REUSABLE LAUNCH VEHICLES  
SPACE SHUTTLE ORBITERS  
SPACE SHUTTLES  
WATER LANDING

SPACECRAFT REENTRY  
3006 3105 3110 3501  
GS ATMOSPHERIC ENTRY  
REENTRY  
.#SPACECRAFT REENTRY  
... UNCONTROLLED REENTRY  
(SPACECRAFT)  
RT EARTH-VENUS TRAJECTORIES  
ENTRY GUIDANCE (STS)  
FLIGHT MECHANICS  
HYPERSONIC REENTRY  
LIFTING REENTRY VEHICLES  
MANNED REENTRY  
RETURN TO EARTH SPACE FLIGHT  
SATELLITE LIFETIME  
SPACECRAFT BREAKUP

SPACECRAFT RELIABILITY  
1505 1905 3110 3404  
GS RELIABILITY

RT #SPACECRAFT RELIABILITY  
CIRCUIT RELIABILITY  
COMPONENT RELIABILITY  
CONTROLLABILITY  
PRELAUNCH PROBLEMS  
QUALITY CONTROL  
SPACECRAFT MAINTENANCE

SPACECRAFT RENDEZVOUS  
USE SPACE RENDEZVOUS

SPACECRAFT SENSORS  
USE SPACECRAFT INSTRUMENTS

SPACECRAFT SHIELDING  
3110 3305  
GS SHIELDING  
#SPACECRAFT SHIELDING  
RT HEAT SHIELDING  
% INSULATED STRUCTURES  
METEOROID PROTECTION  
NOSE CONES  
RADIATION SHIELDING  
RADIO FREQUENCY SHIELDING  
REENTRY SHIELDING  
REUSABLE HEAT SHIELDING  
SAFETY DEVICES  
SOLAR RADIATION SHIELDING

SPACECRAFT STABILITY  
0101 2102 3006  
UF SATELLITE ATTITUDE DISTURBANCE  
GS DYNAMIC CHARACTERISTICS  
DYNAMIC STABILITY  
.. MOTION STABILITY  
.. #SPACECRAFT STABILITY  
STABILITY  
DYNAMIC STABILITY  
.. MOTION STABILITY  
.. #SPACECRAFT STABILITY  
AERODYNAMIC BALANCE  
AERODYNAMIC STABILITY  
ATTITUDE STABILITY  
BUFFETING  
CONTROL STABILITY  
COUNTERBALANCES  
DIRECTIONAL STABILITY  
DISCOS (SATELLITE ATTITUDE CONTROL)  
DUAL SPIN SPACECRAFT  
LATERAL STABILITY  
LIQUID SLOSHING  
LONGITUDINAL STABILITY  
LOW SPEED STABILITY  
NUTATION DAMPERS  
SATELLITE PERTURBATION

TUMBLING MOTION  
WIND TUNNEL STABILITY TESTS

SPACECRAFT STERILIZATION  
0504 3009 3110  
GS CLEANING  
- STERILIZATION  
.#SPACECRAFT STERILIZATION  
DECONTAMINATION  
#SPACECRAFT STERILIZATION  
RT CHEMICAL STERILIZATION  
ETHYLENE OXIDE  
EXOBIOLOGY  
PLANETARY QUARANTINE  
PURIFICATION  
STERILIZATION EFFECTS

SPACECRAFT STRUCTURES  
0102 3110 3203  
RT AIRCRAFT STRUCTURES  
FOLDING STRUCTURES  
FUEL TANKS  
LARGE SPACE STRUCTURES  
METEOROID PROTECTION  
ORBITAL ASSEMBLY  
ROCKET ENGINES  
SATELLITE DESIGN  
SMART STRUCTURES  
SPACE ERECTABLE STRUCTURES  
SPACE STATION STRUCTURES  
STRUCTURAL DESIGN  
% STRUCTURES

SPACECRAFT SURVIVABILITY  
1505  
RT AIRCRAFT SURVIVABILITY  
SPACECRAFT BREAKUP  
SPACECRAFT DEFENSE  
SURVIVAL  
UNCONTROLLED REENTRY (SPACECRAFT)  
VULNERABILITY

SPACECRAFT TELEVISION  
0702 0707 1410 3110 3009  
GS COMMUNICATION EQUIPMENT  
#SPACECRAFT TELEVISION  
.. DIGITAL SPACECRAFT TELEVISION  
.. RANGER BLOCK 3 TELEVISION SYSTEM  
.. SATELLITE TELEVISION  
TELECOMMUNICATION  
#SPACECRAFT TELEVISION  
.. DIGITAL SPACECRAFT TELEVISION  
.. RANGER BLOCK 3 TELEVISION SYSTEM  
.. SATELLITE TELEVISION  
TELEVISION SYSTEMS

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                         | #SPACECRAFT TELEVISION<br>..DIGITAL SPACECRAFT TELEVISION<br>..RANGER BLOCK 3 TELEVISION SYSTEM<br>..SATELLITE TELEVISION<br>COLOR TELEVISION<br>SATELLITE TRANSMISSION<br>STEREOTELEVISION<br>TELEVISION TRANSMISSION                                                                                                                                                                                                                                                                                                | EARTH ORBITAL RENDEZVOUS<br>FLIGHT MECHANICS<br>GODDARD TRAJECTORY DETERMINATION<br>SYSTEM<br>HYPERBOLIC TRAJECTORIES<br>INTERORBITAL TRAJECTORIES<br>LUNAR ORBITAL RENDEZVOUS<br>% MOTION<br>ORBITAL RENDEZVOUS<br>RADIO OCCULTATION<br>REENTRY TRAJECTORIES<br>RENDEZVOUS TRAJECTORIES<br>ROUND TRIP TRAJECTORIES<br>SWINGBY TECHNIQUE | RT                                                                                                                                 | ADVANCED TECHNOLOGY LABORATORY<br>ANNULAR SUSPENSION AND POINTING<br>SYSTEM<br>EXPOS (SPACELAB PAYLOAD)<br>GEOPHYSICAL FLUID FLOW CELLS<br>GERMAN INFRARED LABORATORY<br>GET AWAY SPECIALS (STS)<br>GRIST (TELESCOPE)<br>LIRTS (TELESCOPE)<br>NASA PROGRAMS<br>OSTA-2 PAYLOAD<br>SEPAC (PAYLOAD)<br>SKYLAB PROGRAM<br>SPACE SHUTTLES<br>SPACE TRANSPORTATION SYSTEM<br>SPACEBORNE EXPERIMENTS<br>STARLAB                 |
| SPACECRAFT TEMPERATURE<br>1408<br>RT                       | HEAT PIPES<br>SATELLITE TEMPERATURE<br>SPACECRAFT DESIGN<br>TEMPERATURE CONTROL                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| SPACECRAFT TRACKING<br>0709 1109 3006 3110<br>GS           | TRACKING (POSITION)<br>#SPACECRAFT TRACKING<br>..SATELLITE TRACKING<br>...SATELLITE-TO-SATELLITE TRACKING<br>ADVANCED RANGE INSTRUMENTATION SHIP<br>DEEP SPACE NETWORK<br>MINITRACK SYSTEM<br>MISSILE TRACKING<br>OPTICAL TRACKING<br>POLYSTATION DOPPLER TRACKING SYSTEM<br>RADAR TRACKING<br>RADIO TRACKING<br>SPACE DETECTION AND TRACKING SYSTEM<br>SPACE SURVEILLANCE (GROUND BASED)<br>SPACE SURVEILLANCE (SPACEBORNE)<br>TRACKING NETWORKS<br>TRACKING STATIONS<br>TRANSPONDER CONTROL GROUP<br>UNIFIED S BAND | SPACECREW TRANSFER<br>0410<br>UF INTERVEHICLE SPACECREW TRANSFER<br>RT APOLLO SOYUZ TEST PROJECT<br>COMMAND MODULES<br>MANNED SPACE FLIGHT<br>RENDEZVOUS SPACECRAFT<br>SPACE LOGISTICS                                                                                                                                                   |                                                                                                                                    | SPACELAB PAYLOADS<br>3107 3009<br>GS PAYLOADS<br>#SPACELAB PAYLOADS<br>..AMPS (SATELLITE PAYLOAD)<br>..ATMOSPHERIC CLOUD PHYSICS LAB<br>(SPACELAB)<br>..ATMOSPHERIC GENERAL CIRCULATION<br>EXPERIMENT<br>..GEOPHYSICAL FLUID FLOW CELLS<br>..SOLAR CELL CALIBRATION FACILITY<br>ANNULAR SUSPENSION AND POINTING<br>SYSTEM<br>ASTRO MISSIONS (STS)<br>GET AWAY SPECIALS (STS)<br>SORTIE SYSTEMS<br>SPACE STATION PAYLOADS |
| SPACECRAFT TRACKING AND DATA NETWORK<br>USE STDN (NETWORK) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                    | SPACELAB SIMULATION FLIGHTS<br>USE ASSESS PROGRAM                                                                                                                                                                                                                                                                                                                                                                        |
| SPACECRAFT TRAJECTORIES<br>1904 3006 3110 3009<br>GS       | TRAJECTORIES<br>#SPACECRAFT TRAJECTORIES<br>..EARTH-VENUS TRAJECTORIES<br>..INTERPLANETARY TRAJECTORIES<br>..EARTH-MARS TRAJECTORIES<br>..EARTH-MERCURY TRAJECTORIES<br>..LUNAR TRAJECTORIES<br>..CIRCUMLUNAR TRAJECTORIES<br>..EARTH-MOON TRAJECTORIES<br>..MOON-EARTH TRAJECTORIES<br>ASCENT TRAJECTORIES<br>DESCENT TRAJECTORIES                                                                                                                                                                                   | SPACECRAFT TRAJECTORIES<br>3104 3110 3409 3009<br>GS LABORATORIES<br>.SPACE LABORATORIES<br>..MANNED ORBITAL LABORATORIES<br>..#SPACELAB<br>MANNED SPACECRAFT<br>..MANNED ORBITAL LABORATORIES<br>..#SPACELAB<br>PAYLOADS<br>.SPACE SHUTTLE PAYLOADS<br>..#SPACELAB                                                                      | SPACERS<br>1501 1504<br>RT BUSHINGS<br>DIVIDERS<br>FASTENERS<br>INSERTS<br>ISOLATORS<br>SEPARATORS<br>SPACING<br>WASHERS (SPACERS) | SPACELAB UV-OPTICAL TELESCOPE FACILITY<br>USE STARLAB                                                                                                                                                                                                                                                                                                                                                                    |
| RT                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                    | SPACETENNAS<br>0901                                                                                                                                                                                                                                                                                                                                                                                                      |

## NASA THESAURUS HIERARCHICAL UPDATE

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1504 2304
UF  ELECTROEROSION
   ELECTROSTATIC EROSION
   CUTTING
   #SPARK MACHINING
   MACHINING
   #SPARK MACHINING
   ELECTROFORMING
   EROSION
   METAL CUTTING
   PIERCING

SPARK PLUGS
O904 1504 3301
RT  ARC GENERATORS
   COMBUSTION CHAMBERS
   ELECTRIC SPARKS
   IGNITERS
   IGNITION SYSTEMS
   INTERNAL COMBUSTION ENGINES

SPARK SHADOWGRAPH PHOTOGRAPHY
USE  SHADOWGRAPH PHOTOGRAPHY

SPARKS
2304 2402 3301
GS  #SPARKS
   .ELECTRIC SPARKS
   RT  IGNITION

SPARROW MISSILES
3101 3106 3401
GS  MISSILES
   .AIR TO AIR MISSILES
   .#SPARROW MISSILES
   ...SPARROW 2 MISSILE
   ...SPARROW 3 MISSILE
   RT  SOLID PROPELLANT ROCKET ENGINES

SPARROW 2 MISSILE
3101 3401
GS  MISSILES
   .AIR TO AIR MISSILES
   ..SPARROW MISSILES
   ..#SPARROW 2 MISSILE
   RT  SOLID PROPELLANT ROCKET ENGINES

SPARROW 3 MISSILE
3101 3401
GS  MISSILES
   .AIR TO AIR MISSILES
   ..SPARROW MISSILES
   ..#SPARROW 3 MISSILE
   RT  LIQUID PROPELLANT ROCKET ENGINES

SPARTAN MISSILE
3101 3106 3401
GS  MISSILES
   .ANTIMISSILE MISSILES
   .#SPARTAN MISSILE
   NIKE-ZEUS MISSILE
   SENTINEL SYSTEM
   SPRINT MISSILE
   SURFACE TO AIR MISSILES

SPARTAN SATELLITES
3107 3009
GS  OBSERVATORIES
   .ASTRONOMICAL OBSERVATORIES
   ..ASTRONOMICAL SATELLITES
   ..#SPARTAN SATELLITES
   RT  ASTROPHYSICS
   SOLAR PHYSICS
   ULTRAVIOLET ASTRONOMY

SPAS (ESA PLATFORMS)
USE  SHUTTLE PALLET SATELLITES

SPASMS
O405
GS  MUSCULAR FUNCTION
   #SPASMS
   RT  CONTRACTION
   INVOLUNTARY ACTIONS
   MUSCLES

SPATIAL DEPENDENCIES
2308 2311 2405
GS  DEPENDENCE
   #SPATIAL DEPENDENCIES
   RT  MATHEMATICAL MODELS
   % SPACE
   TIME DEPENDENCE

SPATIAL DISTRIBUTION
1902 1905 3408
UF  MOLIERE FORMULA
   SPATIAL ISOTROPY
   GS  DISTRIBUTION (PROPERTY)
   #SPATIAL DISTRIBUTION
   ..STAR DISTRIBUTION
   RT  ANISOTROPY
   HORIZONTAL DISTRIBUTION
   ION DISTRIBUTION
   METEOROID CONCENTRATION
   PARTICLE DENSITY (CONCENTRATION)
   POSITION (LOCATION)
   SATELLITE CONSTELLATIONS
   STEREOCHEMISTRY
   TELECONNECTIONS (METEOROLOGY)

SPATIAL FILTERING
2306 2310
GS  FILTRATION
   #SPATIAL FILTERING
   RT  ABERRATION
   ATTENUATION
   AUGMENTATION
   BLURRING
   % FILTERS
   HOLOGRAPHY
   IMAGES
   % NOISE
   PHOTOGRAPHS
   PHOTOINTERPRETATION
   PLANE WAVES
   RESOLUTION
   SPECKLE HOLOGRAPHY

SPATIAL ISOTROPY
USE  ISOTROPY
   SPATIAL DISTRIBUTION

SPATIAL MARCHING
O502 3501
RT  ACOUSTIC DUCTS
   DUCT GEOMETRY
   NUMERICAL ANALYSIS
   TIME MARCHING

SPATIAL ORIENTATION
USE  ATTITUDE (INCLINATION)

SPATIAL RESOLUTION
1406 3501
GS  RESOLUTION
   #SPATIAL RESOLUTION
   RT  ATMOSPHERIC CORRECTION
   HIGH RESOLUTION
   IMAGE PROCESSING
   IMAGE RESOLUTION
   IMAGING TECHNIQUES
   SPECTRAL RESOLUTION
   TEMPORAL RESOLUTION

SPECIES DIFFUSION
O404
GS  DIFFUSION
   #SPECIES DIFFUSION
   RT  EVOLUTION (DEVELOPMENT)
   GENETICS

SPECIFIC GRAVITY

```



|                  |                                   |                        |                            |
|------------------|-----------------------------------|------------------------|----------------------------|
| USE              | DENSITY (MASS/VOLUME)             | RELIABILITY            | PLASMA FLUX MEASUREMENT    |
| SPECIFIC HEAT    |                                   | REQUIREMENTS           | SAGNAC EFFECT              |
| 0603             | 1408 3203                         | STANDARDIZATION        | SCATTER PLATES (OPTICS)    |
| UF               | DEBYE TEMPERATURE                 | STANDARDS              | SPECKLE HOLOGRAPHY         |
|                  | HEAT CAPACITY                     | TECHNICAL WRITING      |                            |
| GS               | HEAT                              | TOLERANCES (MECHANICS) |                            |
|                  | #SPECIFIC HEAT                    | USER REQUIREMENTS      |                            |
| RT               | THERMODYNAMIC PROPERTIES          |                        | SPECKLE PATTERNS           |
|                  | .THERMOPHYSICAL PROPERTIES        |                        | 0710 2306 2310             |
|                  | .#SPECIFIC HEAT                   |                        | RT                         |
|                  | ENTHALPY                          |                        | DIFFRACTION PATTERNS       |
|                  | EQUIPARTITION THEOREM             |                        | HOLOGRAPHY                 |
|                  | GRUNEISEN CONSTANT                |                        | LASER OUTPUTS              |
|                  | HEAT BUDGET                       |                        | LIGHT SCATTERING           |
|                  | HEAT OF FUSION                    |                        | % PATTERNS                 |
|                  | ION TEMPERATURE                   |                        | SPECKLE HOLOGRAPHY         |
|                  | LEWIS NUMBERS                     |                        | SURFACE ROUGHNESS EFFECTS  |
|                  | MELTING POINTS                    |                        |                            |
|                  | NEEL TEMPERATURE                  |                        |                            |
|                  | THERMAL CONDUCTIVITY              |                        |                            |
|                  | THERMAL RESISTANCE                |                        |                            |
| SPECIFIC IMPULSE |                                   |                        | SPECTRA                    |
| 2702             | 2806 3106                         |                        | 1411 2310 2311 2401 3001   |
| RT               | IMPULSES                          |                        | UF                         |
|                  | MASS FLOW RATE                    |                        | OPTICAL SPECTRUM           |
|                  | PROPELLANT MASS RATIO             |                        | GS                         |
|                  | PROPELLANTS                       |                        | #SPECTRA                   |
|                  | PROPULSION SYSTEM PERFORMANCE     |                        | .ATOMIC SPECTRA            |
|                  | PROPULSIVE EFFICIENCY             |                        | .CONTINUOUS SPECTRA        |
|                  | ROCKET PROPELLANTS                |                        | .ENERGY SPECTRA            |
|                  | ROCKET THRUST                     |                        | .ELECTRONIC SPECTRA        |
|                  | THERMODYNAMIC EFFICIENCY          |                        | .NEUTRON SPECTRA           |
|                  | THRUST                            |                        | .MASS SPECTRA              |
|                  |                                   |                        | .MOLECULAR SPECTRA         |
|                  |                                   |                        | .ELECTRONIC SPECTRA        |
|                  |                                   |                        | .RAMAN SPECTRA             |
|                  |                                   |                        | .ROTATIONAL SPECTRA        |
|                  |                                   |                        | .VIBRATIONAL SPECTRA       |
|                  |                                   |                        | .NOISE SPECTRA             |
|                  |                                   |                        | .OXYGEN SPECTRA            |
|                  |                                   |                        | .PLASMA SPECTRA            |
|                  |                                   |                        | .POWER SPECTRA             |
|                  |                                   |                        | .CEPSTRA                   |
|                  |                                   |                        | .RADIATION SPECTRA         |
|                  |                                   |                        | .ABSORPTION SPECTRA        |
|                  |                                   |                        | ...FRAUNHOFER LINES        |
|                  |                                   |                        | ...HERZBERG BANDS          |
|                  |                                   |                        | ...TELLURIC LINES          |
|                  |                                   |                        | ...ELECTROMAGNETIC SPECTRA |
|                  |                                   |                        | ...GAMMA RAY SPECTRA       |
|                  |                                   |                        | ...INFRARED SPECTRA        |
|                  |                                   |                        | ...LINE SPECTRA            |
|                  |                                   |                        | ...BALMER SERIES           |
|                  |                                   |                        | ...D LINES                 |
|                  |                                   |                        | ...ELECTRONIC SPECTRA      |
|                  |                                   |                        | ...FRAUNHOFER LINES        |
|                  |                                   |                        | ...H LINES                 |
|                  |                                   |                        | ...H ALPHA LINE            |
|                  |                                   |                        | ...H BETA LINE             |
|                  |                                   |                        | ...H GAMMA LINE            |
|                  |                                   |                        | ...K LINES                 |
|                  |                                   |                        | ...LYMAN SPECTRA           |
|                  |                                   |                        | ...PASCHEN SERIES          |
| SPECIFICATIONS   |                                   |                        |                            |
| 3406             | 4001                              |                        |                            |
| GS               | #SPECIFICATIONS                   |                        |                            |
|                  | .AIRCRAFT SPECIFICATIONS          |                        |                            |
|                  | .EQUIPMENT SPECIFICATIONS         |                        |                            |
|                  | .FUNCTIONAL DESIGN SPECIFICATIONS |                        |                            |
| RT               | AIRCRAFT PERFORMANCE              |                        |                            |
|                  | COMMONALITY                       |                        |                            |
|                  | DRAWINGS                          |                        |                            |
|                  | INSPECTION                        |                        |                            |
|                  | MAINTENANCE                       |                        |                            |
| %                | MATERIALS TESTS                   |                        |                            |
|                  | MECHANICAL PROPERTIES             |                        |                            |
|                  | NAMING                            |                        |                            |
|                  | PERFORMANCE TESTS                 |                        |                            |
|                  | PROCESS CONTROL (INDUSTRY)        |                        |                            |
|                  | PROCUREMENT                       |                        |                            |
|                  | QUALITY                           |                        |                            |
|                  | QUALITY CONTROL                   |                        |                            |

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                          |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPECTRAL SENSITIVITY<br>1411<br>GS<br>SENSITIVITY<br>#SPECTRAL SENSITIVITY<br>RT % FREQUENCY RESPONSE<br>INSTRUMENT ERRORS<br>PHOTOTHERMAL CONVERSION<br>SPECTRA                                                                                                                         | GS<br>RT                              | #SPECTROGRAPHS<br>.HIGH DISPERSION SPECTROGRAPHS<br>SPECTRA<br>SPECTROGRAMS<br>SPECTROMETERS<br>SPECTROSCOPIC ANALYSIS<br>SPECTROSCOPY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RT | ...TOTAL OZONE MAPPING SPECTROMETER<br>ACTINOMETERS<br>CHEMICAL ANALYSIS<br>DIFFRACTOMETERS<br>ELECTRON PROBES<br>GONIOMETERS<br>INFRARED SPECTROSCOPY<br>MICHELSON INTERFEROMETERS<br>OPTICAL EQUIPMENT<br>OPTICAL MEASUREMENT<br>PHOTOGRAMMETERS<br>PHOTOGRAPHIC MEASUREMENT<br>PHOTOMETERS<br>RADIATION COUNTERS<br>SOLAR INSTRUMENTS<br>SPECTRA<br>SPECTRAL REFLECTANCE<br>SPECTROGRAPHS<br>SPECTRORADIOMETERS<br>SPECTROSCOPIC ANALYSIS<br>SPECTROSCOPY<br>SPECTRUM ANALYSIS |
| SPECTRAL SHIFT CONTROL<br>2306<br>RT % CONTROL<br>SPECTRA                                                                                                                                                                                                                                | SPECTROHELIOGRAPHS<br>1411 2902<br>UF | SPECTROHELIOGRAPHS<br>1411 2902<br>UF<br>HELIOGRAPHS<br>HELIOGRAPHY<br>SPECTROHELIOSCOPES<br>IMAGERY<br>#SPECTROHELIOGRAPHS<br>MEASURING INSTRUMENTS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#SPECTROHELIOGRAPHS<br>..SPECTROMETERS<br>..#SPECTROHELIOGRAPHS<br>OPTICAL EQUIPMENT<br>#SPECTROHELIOGRAPHS<br>SOLAR INSTRUMENTS<br>#SPECTROHELIOGRAPHS<br>BLACK AND WHITE PHOTOGRAPHY<br>CORONAGRAPHS<br>SOLAR SPECTROMETERS<br>STARSAT TELESCOPE                                                                                                                                                                                         | GS | SPECTROMETRY<br>USE SPECTROSCOPY<br>SPECTROPHOTOGRAPHY<br>1407 1411 2310 3501<br>GS<br>IMAGERY<br>#SPECTROPHOTOGRAPHY<br>PHOTOGRAPHY<br>#SPECTROPHOTOGRAPHY<br>SPECTROSCOPY<br>#SPECTROPHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>GROUND TRUTH<br>SPECTRAL CORRELATION<br>SPECTRAL RECONNAISSANCE<br>SPECTROGRAMS                                                                                                                                                              |
| SPECTRAL SHIFT CONTROL REACTOR<br>2203 2204<br>GS<br>NUCLEAR REACTORS<br>.LIQUID COOLED REACTORS<br>..WATER COOLED REACTORS<br>...PRESSURIZED WATER REACTORS<br>...#SPECTRAL SHIFT CONTROL REACTOR<br>RT % CONTROL                                                                       | RT                                    | SPECTROHELIOSCOPES<br>USE SPECTROHELIOGRAPHS<br>SPECTROMETERS<br>1406 2311 1411 2903 3501<br>UF<br>SPECTROSCOPES<br>MEASURING INSTRUMENTS<br>#SPECTROMETERS<br>..EBERT SPECTROMETERS<br>..FABRY-PEROT SPECTROMETERS<br>..GAMMA RAY SPECTROMETERS<br>..IMAGING SPECTROMETERS<br>..INFRARED SPECTROMETERS<br>...FILTER WHEEL INFRARED<br>SPECTROMETERS<br>..LASER SPECTROMETERS<br>..MASS SPECTROMETERS<br>..MICROWAVE SPECTROMETERS<br>..NEUTRON SPECTROMETERS<br>..SOLAR BACKSCATTER UV SPECTROMETER<br>..SOLAR SPECTROMETERS<br>..SPECTROHELIOGRAPHS<br>..TIME OF FLIGHT SPECTROMETERS<br>..ULTRAVIOLET SPECTROMETERS<br>...HIGH DISPERSION SPECTROGRAPHS | GS | SPECTROPHOTOMETERS<br>1411 2306 2903<br>GS<br>MEASURING INSTRUMENTS<br>.OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>OPTICAL EQUIPMENT<br>OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS                                        |
| SPECTRAL SIGNATURES<br>0705 1411 2310 2402<br>GS<br>SIGNATURES<br>#SPECTRAL SIGNATURES<br>..MICROWAVE SIGNATURES<br>CEPSTRAL ANALYSIS<br>CHEMICAL ANALYSIS<br>CHEMICAL COMPOSITION<br>CROP IDENTIFICATION<br>EMISSION SPECTRA<br>IDENTIFYING<br>OPTICAL MEASUREMENT<br>SPECTRUM ANALYSIS | RT                                    | SPECTROHELIOSCOPES<br>USE SPECTROHELIOGRAPHS<br>SPECTROMETERS<br>1406 2311 1411 2903 3501<br>UF<br>SPECTROSCOPES<br>MEASURING INSTRUMENTS<br>#SPECTROMETERS<br>..EBERT SPECTROMETERS<br>..FABRY-PEROT SPECTROMETERS<br>..GAMMA RAY SPECTROMETERS<br>..IMAGING SPECTROMETERS<br>..INFRARED SPECTROMETERS<br>...FILTER WHEEL INFRARED<br>SPECTROMETERS<br>..LASER SPECTROMETERS<br>..MASS SPECTROMETERS<br>..MICROWAVE SPECTROMETERS<br>..NEUTRON SPECTROMETERS<br>..SOLAR BACKSCATTER UV SPECTROMETER<br>..SOLAR SPECTROMETERS<br>..SPECTROHELIOGRAPHS<br>..TIME OF FLIGHT SPECTROMETERS<br>..ULTRAVIOLET SPECTROMETERS<br>...HIGH DISPERSION SPECTROGRAPHS | GS | SPECTROPHOTOMETERS<br>1411 2306 2903<br>GS<br>MEASURING INSTRUMENTS<br>.OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>OPTICAL EQUIPMENT<br>OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS                                        |
| SPECTRAL THEORY<br>1902 1905<br>RT<br>LYMAN SPECTRA<br>SPECTRA<br>% THEORIES                                                                                                                                                                                                             | RT                                    | SPECTROHELIOSCOPES<br>USE SPECTROHELIOGRAPHS<br>SPECTROMETERS<br>1406 2311 1411 2903 3501<br>UF<br>SPECTROSCOPES<br>MEASURING INSTRUMENTS<br>#SPECTROMETERS<br>..EBERT SPECTROMETERS<br>..FABRY-PEROT SPECTROMETERS<br>..GAMMA RAY SPECTROMETERS<br>..IMAGING SPECTROMETERS<br>..INFRARED SPECTROMETERS<br>...FILTER WHEEL INFRARED<br>SPECTROMETERS<br>..LASER SPECTROMETERS<br>..MASS SPECTROMETERS<br>..MICROWAVE SPECTROMETERS<br>..NEUTRON SPECTROMETERS<br>..SOLAR BACKSCATTER UV SPECTROMETER<br>..SOLAR SPECTROMETERS<br>..SPECTROHELIOGRAPHS<br>..TIME OF FLIGHT SPECTROMETERS<br>..ULTRAVIOLET SPECTROMETERS<br>...HIGH DISPERSION SPECTROGRAPHS | GS | SPECTROPHOTOMETERS<br>1411 2306 2903<br>GS<br>MEASURING INSTRUMENTS<br>.OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>OPTICAL EQUIPMENT<br>OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS                                        |
| SPECTROGRAMS<br>1411 2402 2903<br>RT<br>LINE SPECTRA<br>SPECTRA<br>SPECTRAL EMISSION<br>SPECTROGRAPHS<br>SPECTROPHOTOGRAPHY<br>SPECTROSCOPY<br>SPECTRUM ANALYSIS                                                                                                                         | RT                                    | SPECTROHELIOSCOPES<br>USE SPECTROHELIOGRAPHS<br>SPECTROMETERS<br>1406 2311 1411 2903 3501<br>UF<br>SPECTROSCOPES<br>MEASURING INSTRUMENTS<br>#SPECTROMETERS<br>..EBERT SPECTROMETERS<br>..FABRY-PEROT SPECTROMETERS<br>..GAMMA RAY SPECTROMETERS<br>..IMAGING SPECTROMETERS<br>..INFRARED SPECTROMETERS<br>...FILTER WHEEL INFRARED<br>SPECTROMETERS<br>..LASER SPECTROMETERS<br>..MASS SPECTROMETERS<br>..MICROWAVE SPECTROMETERS<br>..NEUTRON SPECTROMETERS<br>..SOLAR BACKSCATTER UV SPECTROMETER<br>..SOLAR SPECTROMETERS<br>..SPECTROHELIOGRAPHS<br>..TIME OF FLIGHT SPECTROMETERS<br>..ULTRAVIOLET SPECTROMETERS<br>...HIGH DISPERSION SPECTROGRAPHS | GS | SPECTROPHOTOMETERS<br>1411 2306 2903<br>GS<br>MEASURING INSTRUMENTS<br>.OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>OPTICAL EQUIPMENT<br>OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS                                        |
| SPECTROGRAMS<br>1406 1411 2311 2903 3501                                                                                                                                                                                                                                                 | RT                                    | SPECTROHELIOSCOPES<br>USE SPECTROHELIOGRAPHS<br>SPECTROMETERS<br>1406 2311 1411 2903 3501<br>UF<br>SPECTROSCOPES<br>MEASURING INSTRUMENTS<br>#SPECTROMETERS<br>..EBERT SPECTROMETERS<br>..FABRY-PEROT SPECTROMETERS<br>..GAMMA RAY SPECTROMETERS<br>..IMAGING SPECTROMETERS<br>..INFRARED SPECTROMETERS<br>...FILTER WHEEL INFRARED<br>SPECTROMETERS<br>..LASER SPECTROMETERS<br>..MASS SPECTROMETERS<br>..MICROWAVE SPECTROMETERS<br>..NEUTRON SPECTROMETERS<br>..SOLAR BACKSCATTER UV SPECTROMETER<br>..SOLAR SPECTROMETERS<br>..SPECTROHELIOGRAPHS<br>..TIME OF FLIGHT SPECTROMETERS<br>..ULTRAVIOLET SPECTROMETERS<br>...HIGH DISPERSION SPECTROGRAPHS | GS | SPECTROPHOTOMETERS<br>1411 2306 2903<br>GS<br>MEASURING INSTRUMENTS<br>.OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#SPECTROPHOTOMETERS<br>...INFRARED SPECTROPHOTOMETERS<br>...ULTRAVIOLET SPECTROPHOTOMETERS<br>OPTICAL EQUIPMENT<br>OPTICAL MEASURING INSTRUMENTS<br>..#SPECTROPHOTOMETERS                                        |

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...INFRARED SPECTROPHOTOMETERS
...ULTRAVIOLET SPECTROPHOTOMETERS
    RT    CHEMICAL ANALYSIS
          DUOCHROMATORS
          MONOCHROMATORS
          OPTICAL MEASUREMENT
          PHOTOMETERS
          RADIOMETERS
          SPECTRORADIOMETERS
          SPECTROSCOPIC ANALYSIS
          SPECTROSCOPY

SPECTROPHOTOMETRY
  1411 2306 2903
  GS    OPTICAL MEASUREMENT
        .PHOTOMETRY
        .#SPECTROPHOTOMETRY
        ...STELLAR SPECTROPHOTOMETRY
        SPECTROSCOPY
        #SPECTROPHOTOMETRY
        ..STELLAR SPECTROPHOTOMETRY
        ..ASTRONOMICAL PHOTOMETRY
        COLORIMETRY
        IMAGING SPECTROMETERS
        SPECTROSCOPIC ANALYSIS

    RT

SPECTROPHOTOVOLTAICS
  0301
  RT    ENERGY CONVERSION EFFICIENCY
        ENERGY SPECTRA
        SOLAR CELLS
        SOLAR COLLECTORS

SPECTROPOLARIMETERS
  USE  POLARIMETERS

SPECTRORADIOMETERS
  1411 2306 2402 2902 2903
  GS    MEASURING INSTRUMENTS
        .RADIATION MEASURING INSTRUMENTS
        ..ACTINOMETERS
        ...RADIOMETERS
        ...#SPECTRORADIOMETERS
        SPECTROMETERS
        SPECTROPHOTOMETERS

    RT

SPECTROSCOPES
  USE  SPECTROMETERS

SPECTROSCOPIC ANALYSIS
  0601 1411
  SN    (FOR SPECTROSCOPIC TOOLS IN
        CHEMICAL ANALYSIS)
  GS    CHEMICAL TESTS
        .CHEMICAL ANALYSIS

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.#SPECTROSCOPIC ANALYSIS
SPECTROSCOPY
#SPECTROSCOPIC ANALYSIS
  AUGER SPECTROSCOPY
  AURORAL SPECTROSCOPY
  ELECTROPHOTOMETRY
  FLAME SPECTROSCOPY
  FRAUNHOFER LINE DISCRIMINATORS
  GAS SPECTROSCOPY
  INFRARED SPECTROSCOPY
  LASER SPECTROSCOPY
  MAGNETIC SPECTROSCOPY
  MASS SPECTROSCOPY
  METALLICITY
  MICROANALYSIS
  MOLECULAR SPECTROSCOPY
  NEUTRON ACTIVATION ANALYSIS
  NUCLEAR RADIATION SPECTROSCOPY
  PHOTOELECTRON SPECTROSCOPY
  QUALITATIVE ANALYSIS
  QUANTITATIVE ANALYSIS
  RAMAN SPECTROSCOPY
  SPECTROGRAPHS
  SPECTROMETERS
  SPECTROPHOTOMETERS
  SPECTROPHOTOMETRY
  ULTRAVIOLET SPECTROSCOPY
  VACUUM SPECTROSCOPY
  X RAY SPECTROSCOPY

SPECTROSCOPIC TELESCOPES
  1411 1412 3001
  UF    DIFFRACTION TELESCOPES
  GS    TELESCOPES
        #SPECTROSCOPIC TELESCOPES
        ..MULTISPECTRAL TRACKING TELESCOPES
        ..STRATOSCOPE TELESCOPES
        ..ASTRONOMICAL SPECTROSCOPY
        REFLECTING TELESCOPES
        REFRACTING TELESCOPES
        STELLAR SPECTROPHOTOMETRY

    RT

SPECTROSCOPY
  1411 2903
  UF    SPECTROMETRY
  GS    #SPECTROSCOPY
        .ABSORPTION SPECTROSCOPY
        ..OPTOGALVANIC SPECTROSCOPY
        .ASTRONOMICAL SPECTROSCOPY
        .AUGER SPECTROSCOPY
        .AURORAL SPECTROSCOPY
        .ELECTRON SPECTROSCOPY
        .FLAME SPECTROSCOPY
        .GAS SPECTROSCOPY
        .HOLOGRAPHIC SPECTROSCOPY

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    .INFRARED SPECTROSCOPY
    .MAGNETIC SPECTROSCOPY
    .MASS SPECTROSCOPY
    .MOLECULAR SPECTROSCOPY
    ..RAMAN SPECTROSCOPY
    .NUCLEAR RADIATION SPECTROSCOPY
    .OPTICAL EMISSION SPECTROSCOPY
    ..LASER SPECTROSCOPY
    .PHOTOACOUSTIC SPECTROSCOPY
    .PHOTOELECTRON SPECTROSCOPY
    .RADIO SPECTROSCOPY
    .SECONDARY ION MASS SPECTROMETRY
    .SPECTROPHOTOGRAPHY
    .SPECTROPHOTOMETRY
    ..STELLAR SPECTROPHOTOMETRY
    .SPECTROSCOPIC ANALYSIS
    .ULTRASONIC SPECTROSCOPY
    .ULTRAVIOLET SPECTROSCOPY
    .VACUUM SPECTROSCOPY
    .X RAY SPECTROSCOPY
    CHEMICAL ANALYSIS
    CINESPECTROGRAPHS
    COLORIMETRY
    ELECTROPHOTOMETRY
    FRAUNHOFER LINE DISCRIMINATORS
    ISOELECTRONIC SEQUENCE
    LALLEMAND CAMERAS
    % OPTICS
    PHOTOMETRY
    PRESSURE BROADENING
    SPECTRA
    SPECTRAL EMISSION
    SPECTRAL REFLECTANCE
    SPECTROGRAMS
    SPECTROGRAPHS
    SPECTROMETERS
    SPECTROPHOTOMETERS
    SPECTRUM ANALYSIS
    TIME OF FLIGHT SPECTROMETERS
    VISIBLE SPECTRUM
    ZEEMAN EFFECT

SPECTRUM ANALYSIS
  0601 1411 2306 2310 2402 3001
  UF    SPECTRAL ANALYSIS
  GS    #SPECTRUM ANALYSIS
        .CEPSTRAL ANALYSIS
        .FLAME SPECTROSCOPY
        .MAXIMUM ENTROPY METHOD
        .ABSORPTION SPECTRA
        % ANALYZING
        EMISSION SPECTRA
        FREQUENCY ANALYZERS
        FREQUENCY SCANNING
        GAMMA RAY SPECTROMETERS

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# NASA THESAURUS HIERARCHICAL UPDATE

|                          |                              |                           |
|--------------------------|------------------------------|---------------------------|
| HOLOGRAPHIC SPECTROSCOPY | VOICE COMMUNICATION          | 1402 1410 2104            |
| HYPERTHINE STRUCTURE     | SPEECH BASEBAND COMPRESSION  | UF PRESTON TUBES          |
| KRAMERS-KRONIG FORMULA   | 0405                         | GS SPEEDOMETERS           |
| LASER SPECTROSCOPY       | GS                           | GS DISPLAY DEVICES        |
| LINE SPECTRA             | COMPRESSING                  | #SPEED INDICATORS         |
| MAGNETIC RESONANCE       | #SPEECH BASEBAND COMPRESSION | ..TACHOMETERS             |
| OPTICAL RESONANCE        | BANDWIDTH                    | MEASURING INSTRUMENTS     |
| SIGNAL ANALYSIS          | VOCODERS                     | .INDICATING INSTRUMENTS   |
| SPECTRA                  | VOICE COMMUNICATION          | .#SPEED INDICATORS        |
| SPECTRAL EMISSION        | WAVEFORMS                    | ...TACHOMETERS            |
| SPECTRAL METHODS         | SPEECH DEFECTS               | RT ACCELEROMETERS         |
| SPECTRAL REFLECTANCE     | 0405 0408                    | AIRCRAFT INSTRUMENTS      |
| SPECTRAL RESOLUTION      | GS DEFECTS                   | ANEMOMETERS               |
| SPECTRAL SIGNATURES      | #SPEECH DEFECTS              | APPROACH INDICATORS       |
| SPECTROGRAMS             | RT ARTICULATION (SPEECH)     | FLIGHT INSTRUMENTS        |
| SPECTROMETERS            | PHONEMICS                    | FLOWMETERS                |
| SPECTROSCOPY             | PHONETICS                    | LANDING INSTRUMENTS       |
| STARK EFFECT             | SPEECH DISCRIMINATION        | PITOT TUBES               |
| TOROIDAL DISCHARGE       | USE SPEECH RECOGNITION       | VELOCITY MEASUREMENT      |
| ULTRASONIC SPECTROSCOPY  | SPEECH RECOGNITION           | SPEED REGULATION          |
| ULTRAVIOLET SPECTROSCOPY | 0405 0408 2301               | USE SPEED CONTROL         |
| ZEEMAN EFFECT            | UF SPEECH DISCRIMINATION     | SPEED REGULATORS          |
|                          | GS INTELLIGIBILITY           | 0202 0203 2801            |
|                          | #SPEECH RECOGNITION          | UF GOVERNORS              |
|                          | RECOGNITION                  | GS CONTROL EQUIPMENT      |
|                          | #SPEECH RECOGNITION          | #SPEED REGULATORS         |
|                          | CEPSTRAL ANALYSIS            | REGULATORS                |
|                          | RT PHONEMES                  | #SPEED REGULATORS         |
|                          | PHONEMICS                    | RT CONTROLLERS            |
|                          | PHONETICS                    | ENGINES                   |
|                          | SENSORY DISCRIMINATION       | SPEEDOMETERS              |
|                          | VOICE CONTROL                | USE SPEED INDICATORS      |
|                          | SPEECHES                     | SPENT FUELS               |
|                          | USE LECTURES                 | 2702                      |
|                          | SPEED                        | GS FUELS                  |
|                          | USE VELOCITY                 | .NUCLEAR FUELS            |
|                          | SPEED CONTROL                | .#SPENT FUELS             |
|                          | 0102 0203                    | FUEL CAPSULES             |
|                          | UF SPEED REGULATION          | NEUTRON SOURCES           |
|                          | RT AUTOMATIC CONTROL         | % NUCLEAR ENERGY          |
|                          | % CONTROL                    | NUCLEAR FUEL REPROCESSING |
|                          | CONTROL EQUIPMENT            | REACTOR MATERIALS         |
|                          | CONTROLLERS                  | RECYCLING                 |
|                          | ENGINE CONTROL               | SPERMATOCYTES             |
|                          | HELICOPTER CONTROL           | USE GAMETOCYTES           |
|                          | MANUAL CONTROL               | SPERMATOGENESIS           |
|                          | REGULATORS                   | 0404 0405                 |
|                          | SPEED INDICATORS             | RT ABIOTENESIS            |
|                          |                              | GAMETOCYTES               |

[illegible]

## NASA THESAURUS HIERARCHICAL UPDATE

|              |                                                                                                                                           |                 |                                                                                                                                         |                                                                                                                                                                                                                                                                    |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT           | . SPHERULITES<br>CRYSTALS<br>SPHERES                                                                                                      | SPIN            | USE MONOPOLE ANTENNAS                                                                                                                   | SPREADING                                                                                                                                                                                                                                                          |
| SPHINX       | SPHERULITES<br>1806 2601<br>GS                                                                                                            | SPIN            | SPIN                                                                                                                                    | 0101 2102 2405<br>GS #SPIN                                                                                                                                                                                                                                         |
| RT           | CRYSTALLITES<br>CRYSTALS<br>CRYSTAL STRUCTURE<br>MICROCRYSTALS<br>MICROSTRUCTURE<br>NODULES<br>ROSETTE SHAPES                             | RT              | SPIN-ORBIT INTERACTIONS<br>ELECTRON CAPTURE<br>SPIN-SPIN COUPLING<br>ANGULAR MOMENTUM<br>NUCLEAR CAPTURE<br>% SPINNERS<br>YO-YO DEVICES | . METAL SPINNING<br>. HYDROSPINNING<br>. PARTICLE SPIN<br>. ELECTRON SPIN<br>. ISOTOPIC SPIN<br>. NUCLEAR SPIN<br>. SPIN-ORBIT INTERACTIONS<br>. ELECTRON CAPTURE<br>. SPIN-SPIN COUPLING<br>RT ANGULAR MOMENTUM<br>NUCLEAR CAPTURE<br>% SPINNERS<br>YO-YO DEVICES |
| UF           | 2402 2501 2502 3406 3409<br>(SPACE PLASMA HIGH VOLTAGE<br>INTERACTION EXPERIMENTS)<br>SPACE PLASMA H/V INTERACTION<br>EXPERIMENTS         | SPIN DECOUPLING | 2307 2401 2403 2405<br>GS DECOUPLING                                                                                                    | 2307 2401 2403 2405<br>GS DECOUPLING                                                                                                                                                                                                                               |
| RT           | NASA PROGRAMS<br>PLASMA INTERACTION EXPERIMENT<br>PLASMA-PARTICLE INTERACTIONS<br>PLASMAS (PHYSICS)<br>RESEARCH PROJECTS<br>SPACE PLASMAS | RT              | PHOTOMAGNETIC EFFECTS                                                                                                                   | RT PHOTOMAGNETIC EFFECTS                                                                                                                                                                                                                                           |
| SPHYMOGRAPHY | 0501 1408<br>RT ARTERIES<br>BIOINSTRUMENTATION<br>BLOOD PRESSURE<br>HEART RATE<br>MEASUREMENT<br>RECORDING INSTRUMENTS                    | SPIN DYNAMICS   | 2307 2308 2403 2405<br>RT AIRCRAFT SPIN                                                                                                 | 2307 2308 2403 2405<br>RT AIRCRAFT SPIN                                                                                                                                                                                                                            |
| SPICULES     | 0402 0404 2902<br>GS STELLAR ACTIVITY<br>SOLAR ACTIVITY<br>SOLAR ATMOSPHERE                                                               | SPIN EXCHANGE   | 2401 2404 2405<br>GS EXCHANGING                                                                                                         | 2401 2404 2405<br>GS EXCHANGING                                                                                                                                                                                                                                    |
| RT           | CHROMOSPHERE<br>PHOTOSPHERE<br>SOLAR ATMOSPHERE                                                                                           | RT              | RESONANCE CHARGE EXCHANGE                                                                                                               | RT RESONANCE CHARGE EXCHANGE                                                                                                                                                                                                                                       |
| SPIDERS      | 0402<br>GS ANIMALS<br>INVERTEBRATES<br>ARTHROPODS<br>SPIDERS                                                                              | SPIN FORGING    | USE METAL SPINNING                                                                                                                      | SPIN FORGING<br>USE METAL SPINNING                                                                                                                                                                                                                                 |
| RT           | SPIDERS                                                                                                                                   | SPIN GLASS      | 1805<br>GS GLASS                                                                                                                        | SPIN GLASS<br>1805<br>GS GLASS                                                                                                                                                                                                                                     |
| GS           | ANIMALS<br>INVERTEBRATES<br>ARTHROPODS<br>SPIDERS                                                                                         | RT              | AMORPHOUS MATERIALS<br>MAGNETIC PROPERTIES<br>METALLIC GLASSES<br>SPIN-LATTICE RELAXATION<br>SUPERCONDUCTIVITY                          | RT AMORPHOUS MATERIALS<br>MAGNETIC PROPERTIES<br>METALLIC GLASSES<br>SPIN-LATTICE RELAXATION<br>SUPERCONDUCTIVITY                                                                                                                                                  |

[illegible]



[illegible]

LASER CUTTING  
% SEPARATION  
SLICING  
WATER SPLITTING

SPODUMENE  
1806  
GS

ALUMINUM COMPOUNDS  
#SPODUMENE  
CHALCOGENIDES  
.OXIDES  
..SILICON OXIDES  
..#SPODUMENE  
LITHIUM COMPOUNDS  
#SPODUMENE  
MINERALS  
#SPODUMENE  
SILICON COMPOUNDS  
.SILICATES  
..SODIUM SILICATES  
..#SPODUMENE  
.SILICON OXIDES  
..#SPODUMENE  
SODIUM COMPOUNDS  
.SODIUM SILICATES  
..#SPODUMENE

SPOILER SLOT AIRLORNS  
O102 0104 0202  
GS AIRFOILS  
.AILERONS  
.#SPOILER SLOT AIRLORNS  
CONTROL SURFACES  
.AILERONS  
.#SPOILER SLOT AIRLORNS  
SPOILERS

RT

SPOILERS  
O102 0104 0202 1202  
GS AIRFOILS  
#SPOILERS  
CONTROL SURFACES  
#SPOILERS  
DRAG DEVICES  
#SPOILERS  
AERODYNAMIC BRAKES  
BOUNDARY LAYER CONTROL  
DEFLECTORS  
FLAPS (CONTROL SURFACES)  
GUST ALLEVIATORS  
LEADING EDGE SLATS  
SPOILER SLOT AIRLORNS  
VORTEX ALLEVIATION  
WINGS

SPOKES  
1504 1902 3203  
RT HUBS  
WHEELS

SPONGES (MATERIALS)  
0402 0505  
SN (ORGANIC OPEN-CELL STRUCTURES)  
RT ELASTOMERS  
% MATERIALS  
POLYURETHANE FOAM  
POROUS MATERIALS

SPONTANEOUS COMBUSTION  
3301 3302  
GS COMBUSTION  
#SPONTANEOUS COMBUSTION  
RT COMBUSTION TEMPERATURE  
EXPLOSIONS  
FIRE POINT  
FIRE PREVENTION  
FLAMMABILITY  
FLASH POINT  
FUEL COMBUSTION  
HAZARDS  
HYPERGOLIC ROCKET PROPELLANTS  
IGNITION  
IGNITION TEMPERATURE  
PROPELLANT SENSITIVITY  
PYROPHORIC MATERIALS

SPONTANEOUS EMISSION  
1601 2310 2402 2502  
GS EMISSION  
#SPONTANEOUS EMISSION  
RT ATOMIC ENERGY LEVELS  
ELECTROMAGNETIC RADIATION  
EMISSION SPECTRA  
SPECTRAL EMISSION

SPOOLS  
1504  
RT % CONTAINERS  
INSERTS  
MAGAZINES (SUPPLY CHAMBERS)  
REELS  
SPINDLES

SPORADIC E LAYER  
1302 3009  
GS EARTH ATMOSPHERE  
.UPPER ATMOSPHERE  
..EARTH IONOSPHERE  
...E REGION  
...#SPORADIC E LAYER

SPORADIC METEORIDS  
3005  
SN (METEORIDS NOT ASSOCIATED WITH A  
METEOROID SHOWER OR STREAM)  
CELESTIAL BODIES  
.METEORIDS  
.#SPORADIC METEORIDS  
RT METEOR TRAILS  
METEOROID CONCENTRATION

SPORES  
0404 0407 0409  
GS #SPORES  
.MICROSPORES  
RT FUNGI  
MICROORGANISMS  
PLANTS (BOTANY)  
PROTOZOA  
TETRAD THEORY

SPORTS MEDICINE  
0406  
RT AEROSPACE MEDICINE  
ATHLETES  
CLINICAL MEDICINE  
EXERCISE PHYSIOLOGY  
MEDICAL SCIENCE  
PHYSICAL FITNESS  
PHYSIOLOGICAL EFFECTS

SPOT (FRENCH SATELLITE)  
3107  
GS ARTIFICIAL SATELLITES  
.FRENCH SATELLITES  
.#SPOT (FRENCH SATELLITE)  
RT CROP IDENTIFICATION  
EARTH OBSERVATIONS (FROM SPACE)  
EARTH RESOURCES  
LAND USE  
MAPPING  
SOIL MAPPING  
STEREOPHOTOGRAPHY

SPOT WELDS  
1507  
GS JOINTS (JUNCTIONS)  
.METAL JOINTS  
..WELDED JOINTS

# NASA THESAURUS HIERARCHICAL UPDATE

RT                   ..#SPOT WELDS  
                  BEADS  
                  ELECTRIC WELDING  
                  FUSION WELDING  
                  PRESSURE WELDING  
                  ULTRASONIC WELDING

SPRAY CHARACTERISTICS  
1201 1202  
RT % CHARACTERISTICS  
  SPRAYS  
  SPRAYING

SPRAY CONDENSERS  
1202 1203 1504  
RT JET CONDENSERS  
  SPRAYS

SPRAY INGESTION  
1108  
RT GAS TURBINES  
  LANDING GEAR  
  SALT SPRAY TESTS

SPRAY NOZZLES  
1202 1203 1504  
RT ANNULAR NOZZLES  
  CONICAL NOZZLES  
  FUEL INJECTION  
  FUEL SYSTEMS  
  INJECTORS  
  % NOZZLES  
  ORIFICES  
  SPRAYS

SPRAYED COATINGS  
1801 1802  
UF SPRAYED PROTECTIVE COATINGS  
GS COATINGS  
  #SPRAYED COATINGS  
  RT CERAMIC COATINGS  
    FINISHES  
    LACQUERS  
    METAL COATINGS  
    PAINTS  
    PLASMA SPRAYING  
    PLASTIC COATINGS  
    PRIMERS (COATINGS)  
    PROTECTIVE COATINGS  
    VARNISHES

SPRAYED PROTECTIVE COATINGS  
USE PROTECTIVE COATINGS  
  SPRAYED COATINGS

SPRAYS  
1202 1204 1504  
UF SPRAYING APPARATUS  
  SPRAYS  
  RT ATOMIZERS  
    BLOWERS  
    COLLOIDAL GENERATORS  
    CONTACTORS  
    % CONTAINERS  
    % DIFFUSERS  
    DISPENSERS  
    DISTRIBUTORS  
    DROPS (LIQUIDS)  
    EJECTORS  
    FUEL SPRAYS  
    % JETS  
    MATERIALS HANDLING  
    MIXERS  
    % NOZZLES  
    PROPELLANT SPRAYS  
    SPRAY CHARACTERISTICS  
    SPRAY CONDENSERS  
    SPRAY NOZZLES  
    SPRAYING  
    VAPORIZERS

SPRAYING  
1201 1202  
GS #SPRAYING  
  .ARC SPRAYING  
  .CROP DUSTING  
  .FLAME SPRAYING  
  .METAL SPRAYING  
  .PLASMA SPRAYING

RT AERATION  
  AEROLS  
  ATOMIZING  
  BLOWING  
  COATING  
  COATINGS  
  DIFFUSION  
  DISPERSING  
  ENTRAINMENT  
  FORMING TECHNIQUES  
  FUMIGATION  
  LIQUID ATOMIZATION  
  METALLIZING  
  MIXING  
  PREMIXING  
  SEALING  
  SPRAY CHARACTERISTICS  
  SPRAYS  
  SPRINKLING  
  VAPORIZING

1369

WETTING  
  
SPRAYING APPARATUS  
  USE SPRAYS  
  
SPRAYS  
  USE SPRAYS  
  
SPREAD F  
  1302 2306  
  RT F 2 REGION  
    IONOSPHERIC STORMS  
    MAGNETIC STORMS  
  
SPREAD REFLECTION  
  0710  
  GS REFLECTION  
    #SPREAD REFLECTION  
    RT GLARE  
    INFRARED REFLECTION  
    OPTICAL REFLECTION  
    SCATTERING  
    SIGNAL REFLECTION  
    ULTRAVIOLET REFLECTION  
    WAVE REFLECTION  
  
SPREAD SPECTRUM TRANSMISSION  
  0705  
  GS TRANSMISSION  
    .ELECTROMAGNETIC WAVE TRANSMISSION  
    ..RADIO TRANSMISSION  
    ..#SPREAD SPECTRUM TRANSMISSION  
    RT COMMUNICATION  
      FREQUENCY HOPPING  
  
SPREADING  
  1204 2306 2310  
  RT ADHESION  
    COHESION  
    DIFFUSION  
    DISPERSING  
    DISPOSAL  
    DUMPING  
    EMPTYING  
    INTERFACIAL TENSION  
    INTERNAL PRESSURE  
    MATERIALS HANDLING  
    SCATTERING  
      % SEPARATION  
      SPILLING  
      SWELLING  
      THROWING  
      UNLOADING  
  
SPRING (SEASON)

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2001 SEASONS
GS #SPRING (SEASON)
RT AUTUMN
WINTER

SPRINGS (ELASTIC)
1504 2308
RT % COILS
ENERGY STORAGE
FRAMES
OSCILLATION DAMPERS
OSCILLATIONS
RESILIENCE
SHOCK ABSORBERS
SUSPENSION SYSTEMS (VEHICLES)
VIBRATION ISOLATORS

SPRINGS (WATER)
1305 1306
GS RESOURCES
.EARTH RESOURCES
.#SPRINGS (WATER)
WATER
#SPRINGS (WATER)
RT AQUIFERS
FRESH WATER
GROUND WATER
INLAND WATERS
LAKES
OASES
POTABLE WATER
WATER TABLES
WELLS

SPRINKLING
3407
RT SCATTERING
SPRAYING
WETTING

SPRINT MISSILE
3101 3401
GS MISSILES
.ANTIMISSILE MISSILES
.#SPRINT MISSILE
.SURFACE TO AIR MISSILES
.#SPRINT MISSILE
NIKE-ZEUS MISSILE
SENTINEL SYSTEM
SOLID PROPELLANT ROCKET ENGINES
SPARTAN MISSILE

SPUR (REACTORS)

USE SPACE POWER UNIT REACTORS

SPURT (TRAJECTORIES)
USE SPINNING UNGUIDED ROCKET TRAJECTORY

SPUTNIK SATELLITES
3107
GS ARTIFICIAL SATELLITES
.SOVIET SATELLITES
.#SPUTNIK SATELLITES
...SPUTNIK 1 SATELLITE
...SPUTNIK 2 SATELLITE
...SPUTNIK 3 SATELLITE
...SPUTNIK 4 SATELLITE
...SPUTNIK 5 SATELLITE
SOVIET SPACECRAFT
#SPUTNIK SATELLITES
..SPUTNIK 1 SATELLITE
..SPUTNIK 2 SATELLITE
..SPUTNIK 3 SATELLITE
..SPUTNIK 4 SATELLITE
..SPUTNIK 5 SATELLITE

SPUTNIK 1 SATELLITE
3107
GS ARTIFICIAL SATELLITES
.METEOROLOGICAL SATELLITES
.#SPUTNIK 1 SATELLITE
.SOVIET SATELLITES
..SPUTNIK SATELLITES
..SPUTNIK 1 SATELLITE
SOVIET SPACECRAFT
.SPUTNIK SATELLITES
.#SPUTNIK 1 SATELLITE

SPUTNIK 2 SATELLITE
3107 3409
GS ARTIFICIAL SATELLITES
.BIOSATELLITES
.#SPUTNIK 2 SATELLITE
.METEOROLOGICAL SATELLITES
.#SPUTNIK 2 SATELLITE
.SOVIET SATELLITES
..SPUTNIK SATELLITES
..SPUTNIK 2 SATELLITE
SOVIET SPACECRAFT
.SPUTNIK SATELLITES
.#SPUTNIK 2 SATELLITE

SPUTNIK 3 SATELLITE
3107
GS ARTIFICIAL SATELLITES
.GEOPHYSICAL SATELLITES
.#SPUTNIK 3 SATELLITE
.METEOROLOGICAL SATELLITES

SPUTNIK 4 SATELLITE
3107
GS ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..SPUTNIK SATELLITES
..SPUTNIK 4 SATELLITE
SOVIET SPACECRAFT
.SPUTNIK SATELLITES
.#SPUTNIK 4 SATELLITE

SPUTNIK 5 SATELLITE
3107
GS ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..SPUTNIK SATELLITES
..SPUTNIK 5 SATELLITE
SOVIET SPACECRAFT
.SPUTNIK SATELLITES
.#SPUTNIK 5 SATELLITE

VENUS PROBES
RT VENUS PROBES

SPUTTERING
O604 1002 1504 1704 2501 2502 3404
GS #SPUTTERING
.MAGNETRON SPUTTERING
RT ARC WELDING
% BOMBARDMENT
DEPOSITION
DUOPLASMATRONS
ELECTRON BOMBARDMENT
EMISSION
ION PLATING
ION SOURCES
METAL PARTICLES
PLASMA ETCHING
SURFACE FINISHING
THERMAL INSTABILITY

SPUTTERING GAGES
O905 1002 1406
GS MEASURING INSTRUMENTS
#SPUTTERING GAGES
RT METAL FILMS
THIN FILMS

SQUALLS
2001 2003

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## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

| RT                                 | USE  | SPACE SHUTTLE UPPER STAGE D | RT                                  | USE  | SPACE SHUTTLE UPPER STAGE D |
|------------------------------------|------|-----------------------------|-------------------------------------|------|-----------------------------|
| SRET SATELLITES                    | 3107 | GS                          | ST LAWRENCE VALLEY (NORTH AMERICA)  | 1305 | GS                          |
| ARTIFICIAL SATELLITES              |      |                             | LANDFORMS                           |      |                             |
| FRENCH SATELLITES                  |      |                             | #ST LAWRENCE VALLEY (NORTH AMERICA) |      |                             |
| #SRET SATELLITES                   |      |                             | VALLEYS                             |      |                             |
| ...SRET 1 SATELLITE                |      |                             | #ST LAWRENCE VALLEY (NORTH AMERICA) |      |                             |
| ...SRET 2 SATELLITE                |      |                             | VALLEYS                             |      |                             |
| METEOROLOGICAL SATELLITES          |      |                             | #ST LAWRENCE VALLEY (NORTH AMERICA) |      |                             |
| #SRET SATELLITES                   |      |                             | CANADA                              |      |                             |
| ...SRET 1 SATELLITE                |      |                             | MAINE                               |      |                             |
| ...SRET 2 SATELLITE                |      |                             | NEW HAMPSHIRE                       |      |                             |
| FRENCH SPACE PROGRAM               |      |                             | NEW YORK                            |      |                             |
|                                    |      |                             | VERMONT                             |      |                             |
| RT                                 |      |                             |                                     |      |                             |
| SRET 1 SATELLITE                   |      |                             | ST LOUIS-KANSAS CITY CORRIDOR (MO)  |      |                             |
| 3107                               |      |                             | 1305                                |      |                             |
| GS                                 |      |                             | CORRIDORS                           |      |                             |
| ARTIFICIAL SATELLITES              |      |                             | #ST LOUIS-KANSAS CITY CORRIDOR (MO) |      |                             |
| FRENCH SATELLITES                  |      |                             | MISSOURI                            |      |                             |
| ...SRET SATELLITES                 |      |                             | REGIONAL PLANNING                   |      |                             |
| ...#SRET 1 SATELLITE               |      |                             |                                     |      |                             |
| METEOROLOGICAL SATELLITES          |      |                             |                                     |      |                             |
| #SRET SATELLITES                   |      |                             |                                     |      |                             |
| ...SRET 1 SATELLITE                |      |                             |                                     |      |                             |
| ...SRET 2 SATELLITE                |      |                             |                                     |      |                             |
| FRENCH SPACE PROGRAM               |      |                             |                                     |      |                             |
|                                    |      |                             |                                     |      |                             |
| RT                                 |      |                             |                                     |      |                             |
| SRET 2 SATELLITE                   |      |                             | ST VENANT FLEXURE PROBLEM           |      |                             |
| 3107                               |      |                             | USE SAINT VENANT PRINCIPLE          |      |                             |
| GS                                 |      |                             |                                     |      |                             |
| ARTIFICIAL SATELLITES              |      |                             |                                     |      |                             |
| FRENCH SATELLITES                  |      |                             |                                     |      |                             |
| ...SRET SATELLITES                 |      |                             |                                     |      |                             |
| ...#SRET 2 SATELLITE               |      |                             |                                     |      |                             |
| METEOROLOGICAL SATELLITES          |      |                             |                                     |      |                             |
| #SRET SATELLITES                   |      |                             |                                     |      |                             |
| ...SRET 2 SATELLITE                |      |                             |                                     |      |                             |
|                                    |      |                             |                                     |      |                             |
| SRI LANKA                          |      |                             |                                     |      |                             |
| 1305                               |      |                             |                                     |      |                             |
| UF                                 |      |                             |                                     |      |                             |
| CEYLON                             |      |                             |                                     |      |                             |
| NATIONS                            |      |                             |                                     |      |                             |
| #SRI LANKA                         |      |                             |                                     |      |                             |
| RT                                 |      |                             |                                     |      |                             |
| ASIA                               |      |                             |                                     |      |                             |
| SS-11 MISSILE                      |      |                             |                                     |      |                             |
| 3101                               |      |                             |                                     |      |                             |
| 3401                               |      |                             |                                     |      |                             |
| GS                                 |      |                             |                                     |      |                             |
| MISSILES                           |      |                             |                                     |      |                             |
| #SS-11 MISSILE                     |      |                             |                                     |      |                             |
| RT                                 |      |                             |                                     |      |                             |
| MULTISTAGE ROCKET VEHICLES         |      |                             |                                     |      |                             |
| SOLID PROPELLANT ROCKET ENGINES    |      |                             |                                     |      |                             |
| SSGS (STANDARDIZED SPACE GUIDANCE) |      |                             |                                     |      |                             |
| USE STANDARDIZED SPACE GUIDANCE    |      |                             |                                     |      |                             |
| SSUS-A                             |      |                             |                                     |      |                             |
| USE SPACE SHUTTLE UPPER STAGE A    |      |                             |                                     |      |                             |
| SSUS-D                             |      |                             |                                     |      |                             |

NASA THESAURUS HIERARCHICAL UPDATE

...PITCHING MOMENTS  
...ROLLING MOMENTS  
...YAWING MOMENTS  
RT COMPLEX VARIABLES  
DAMPING  
DIFFERENTIAL EQUATIONS  
MOMENTS OF INERTIA  
REAL VARIABLES  
VECTOR ANALYSIS

STABILITY TESTS  
1108 1110 2702  
GS #STABILITY TESTS  
. FLIGHT STABILITY TESTS  
. WIND TUNNEL STABILITY TESTS  
RT CORROSION TESTS  
DAMPING TESTS  
ELECTRONIC EQUIPMENT TESTS  
FLIGHT TESTS  
FUEL TESTS  
GROUND TESTS  
MISSILE TESTS  
PROPELLANT TESTS  
RESONANCE TESTING  
% TESTS  
VIBRATION TESTS

STABILIZATION  
3407  
UF MISSILE STABILIZATION  
GS #STABILIZATION  
. SIGNAL STABILIZATION  
. SPIN STABILIZATION  
. THREE AXIS STABILIZATION  
RT ACID BASE EQUILIBRIUM  
BALANCING  
CONSOLIDATION  
% CONTROL  
% EQUILIBRIUM  
HEAT TREATMENT  
HORIZONTAL ORIENTATION  
LASER GYROSCOPES  
PHASE STABILITY (MATERIALS)  
STABILIZERS (AGENTS)  
STRESS RELIEVING  
VERTICAL ORIENTATION

STABILIZED PLATFORMS  
1403 1410 2102  
RT GIMBALS  
GYROSCOPIC STABILITY  
GYROSTABILIZERS  
INERTIAL GUIDANCE  
% PLATFORMS  
THREE AXIS STABILIZATION

% STABILIZERS  
0104 0202 1402 1403 1410  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT GYROSCOPES  
SEA KEEPING  
STABILIZERS (AGENTS)  
STABILIZERS (FLUID DYNAMICS)

STABILIZERS (AGENTS)  
0602 3404  
RT ADDITIVES  
% AGENTS  
ANTICOAGULANTS  
ANTIOXIDANTS  
NEUTRALIZERS  
PRESERVATIVES  
RETARDANTS  
STABILITY  
STABILIZATION  
% STABILIZERS

STABILIZERS (FLUID DYNAMICS)  
0104 0202 1202  
UF HORIZONTAL STABILIZERS  
VERTICAL STABILIZERS  
VERTICAL TAILS  
GS #STABILIZERS (FLUID DYNAMICS)  
. HORIZONTAL TAIL SURFACES  
RT AERIAL RUDDERS  
AIRFOILS  
CONTROL SURFACES  
% DYNAMICS  
ELEVATORS (CONTROL SURFACES)  
FINS  
KEELS  
RUDDERS  
% STABILIZERS  
SWEPTBACK TAIL SURFACES  
T TAIL SURFACES  
TABS (CONTROL SURFACES)  
TAIL ASSEMBLIES  
TAIL SURFACES  
TRAPEZOIDAL TAIL SURFACES

STABLE OSCILLATIONS  
0101 0710 1002 2309  
GS OSCILLATIONS  
RT #STABLE OSCILLATIONS  
DYNAMIC STABILITY  
FREQUENCY PULLING  
GYROSCOPIC STABILITY

MOTION STABILITY  
NONSTABILIZED OSCILLATION  
PILOT INDUCED OSCILLATION  
RESONANT VIBRATION  
TRANSVERSE OSCILLATION  
UNDAMPED OSCILLATIONS  
WING OSCILLATIONS

STACKING FAULT ENERGY  
2601 3203  
RT CRYSTAL DEFECTS  
% ENERGY  
TWINNING

STACKING FAULTS  
USE CRYSTAL DEFECTS

STACKS  
2401 2601  
RT CHIMNEYS  
CRYSTAL DEFECTS  
MATERIALS HANDLING

STADAN (SATELLITE TRACKING NETWORK)  
USE STDN (NETWORK)

STADIMETERS  
1406  
GS MEASURING INSTRUMENTS  
. DISTANCE MEASURING EQUIPMENT  
. #STADIMETERS  
RT RANGE FINDERS  
SEXTANTS

STAGE SEPARATION  
2802 2806 3106  
UF STAGING (ROCKETS)  
RT BOOSTER ROCKET ENGINES  
EXPENDABLE STAGES (SPACECRAFT)  
INTERIM STAGES (SPACECRAFT)  
LUNAR MODULE ASCENT STAGE  
MISSILES  
MULTISTAGE ROCKET VEHICLES  
PROPELLANT MASS RATIO  
ROCKET VEHICLES  
% SEPARATION  
SPACE SHUTTLE ASCENT STAGE  
SUSTAINER ROCKET ENGINES  
THRUST TERMINATION  
UPPER STAGE ROCKET ENGINES

STAGGERING  
0101 0702 0703 3203  
RT % CONFIGURATIONS  
DISORIENTATION

|                           |                                      |                                |
|---------------------------|--------------------------------------|--------------------------------|
| STAGING (ROCKETS)         | ..#STAINLESS STEELS                  | SWAGING                        |
| USE STAGE SEPARATION      | ....AUSTENITIC STAINLESS STEELS      | UPSETTING                      |
|                           | ....FERRITIC STAINLESS STEELS        |                                |
|                           | ....MARTENSITIC STAINLESS STEELS     |                                |
| STAGNATION FLOW           | RT CHROMIUM ALLOYS                   | STANDARD ATMOSPHERES           |
| O101 1202 1203            | MARAGING STEELS                      | USE REFERENCE ATMOSPHERES      |
| GS FLUID FLOW             | MOLYBDENUM ALLOYS                    |                                |
| .INVISCID FLOW            | NICKEL ALLOYS                        | STANDARD DEVIATION             |
| .#STAGNATION FLOW         | NICKEL STEELS                        | 1902 1905                      |
| BOUNDARY LAYER FLOW       |                                      | GS MOMENTS                     |
| BOUNDARY LAYER SEPARATION |                                      | .DISTRIBUTION MOMENTS          |
| COMPRESSIBLE FLOW         | STAIRCASES                           | .#STANDARD DEVIATION           |
| STAGNATION POINT          | USE STAIRWAYS                        | STATISTICAL ANALYSIS           |
|                           |                                      | #STANDARD DEVIATION            |
|                           | STAIRSTEPS                           | RT CONFIDENCE LIMITS           |
| STAGNATION POINT          | 1305                                 | ESTIMATING                     |
| O101 1202 1203            | RT BACKWARD FACING STEPS             | HETEROGENEITY                  |
| UF STAGNATION REGION      | FORMATIONS                           | QUALITY CONTROL                |
| RT BLUNT BODIES           | % STEPS                              | RANGE (EXTREMES)               |
| BOUNDARY LAYER FLOW       | TOPOGRAPHY                           | VARIABILITY                    |
| BOUNDARY LAYER SEPARATION |                                      | VARIANCE (STATISTICS)          |
| STAGNATION FLOW           | STAIRWAYS                            |                                |
|                           | O506 1102 1103                       | STANDARD LAUNCH VEHICLE 3      |
| FLUID DYNAMICS            | UF STAIRCASES                        | USE ATLAS SLV-3 LAUNCH VEHICLE |
| HEAT TRANSFER             | RT BUILDINGS                         |                                |
| STAGNATION FLOW           | ESCALATORS                           | STANDARD LAUNCH VEHICLE 5      |
|                           | LADDERS                              | 3103 3110                      |
|                           | TREADS                               | GS LAUNCH VEHICLES             |
|                           |                                      | .#STANDARD LAUNCH VEHICLES     |
| STAGNATION PRESSURE       |                                      | ROCKET VEHICLES                |
| 1202 1203 1408 2502 3501  | % STALLING                           | .#STANDARD LAUNCH VEHICLES     |
| GS PRESSURE               | O102 O104 1202 1203                  |                                |
| #STAGNATION PRESSURE      | SN (USE OF A MORE SPECIFIC TERM IS   | STANDARD LAUNCH VEHICLES       |
| COMPRESSIBLE FLOW         | RECOMMENDED--CONSULT THE TERMS       |                                |
| INLET PRESSURE            | LISTED BELOW)                        |                                |
|                           | RT AERODYNAMIC STALLING              |                                |
|                           | BOUNDARY LAYER SEPARATION            |                                |
|                           | ENGINE FAILURE                       |                                |
|                           |                                      | STANDARD LAUNCH VEHICLES       |
| STAGNATION REGION         |                                      | 3103 3110                      |
| USE STAGNATION POINT      |                                      | UF SLV                         |
|                           |                                      | GS LAUNCH VEHICLES             |
| STAGNATION TEMPERATURE    |                                      | #STANDARD LAUNCH VEHICLES      |
| 1202 1203 1408 3501       | STAMPING                             | ..ATLAS SLV-3 LAUNCH VEHICLE   |
| GS TEMPERATURE            | 1504 1704                            | ..STANDARD LAUNCH VEHICLE 5    |
| #STAGNATION TEMPERATURE   | SN (EXCLUDES IDENTIFICATION MARKING) | ROCKET VEHICLES                |
| ADIABATIC FLOW            | GS FORMING TECHNIQUES                | #STANDARD LAUNCH VEHICLES      |
| COMPRESSIBLE FLOW         | .PRESSING (FORMING)                  | ..ATLAS SLV-3 LAUNCH VEHICLE   |
| INVISCID FLOW             | .#STAMPING                           | ..STANDARD LAUNCH VEHICLE 5    |
|                           | RT % BLANKING                        |                                |
|                           | BLANKING (CUTTING)                   | RT ATLAS D ICBM                |
|                           | COINING                              | % VEHICLES                     |
|                           | COLD WORKING                         |                                |
|                           | DIES                                 | STANDARDIZATION                |
|                           | DIMPLING                             | 1505 3407                      |
|                           | FORGING                              | GS #STANDARDIZATION            |
|                           | HOT ISOSTATIC PRESSING               | RT                             |
|                           | HOT PRESSING                         | .COMMONALITY                   |
|                           | METAL WORKING                        | CALIBRATING                    |
|                           | PUNCHES                              | METRICATION                    |
|                           | SHEARING                             | NAMING                         |
|                           |                                      | NUMERICAL CONTROL              |
| STAINING                  |                                      |                                |
| O404 O405 O601            |                                      |                                |
| RT CHEMICAL TESTS         |                                      |                                |
| DISCOLORATION             |                                      |                                |
| MARKING                   |                                      |                                |
| METHYLENE                 |                                      |                                |
| METHYLENE BLUE            |                                      |                                |
|                           |                                      |                                |
| STAINLESS STEELS          |                                      |                                |
| 1701 1704                 |                                      |                                |
| GS ALLOYS                 |                                      |                                |
| .IRON ALLOYS              |                                      |                                |
| ..STEELS                  |                                      |                                |



NASA THESAURUS HIERARCHICAL UPDATE

PRODUCT DEVELOPMENT  
PRODUCTION ENGINEERING  
QUALITY CONTROL  
SPECIFICATIONS  
STANDARDS  
VARIABILITY

STANDARDIZED SPACE GUIDANCE  
3110  
UF SSGS (STANDARDIZED SPACE GUIDANCE)  
GS GUIDANCE (MOTION)  
RT #STANDARDIZED SPACE GUIDANCE  
SPACE NAVIGATION

STANDARDS  
1505 3406  
UF REFERENCES (STANDARDS)  
GS #STANDARDS  
-FREQUENCY STANDARDS  
-REFERENCE ATMOSPHERES  
RT ACCEPTABILITY  
ACCURACY  
CALIBRATING  
% CODES  
CONVENTIONS  
CRITERIA  
INSPECTION  
% MEASUREMENT  
% MEASURES  
METROLOGY  
% PERFORMANCE  
PERFORMANCE TESTS  
QUALITY CONTROL  
RELIABILITY  
SAMPLING  
SPECIFICATIONS  
STANDARDIZATION  
TEMPERATURE SCALES  
TOLERANCES (MECHANICS)  
VALIDITY  
VALUE ENGINEERING

STANDING WAVE RATIOS  
0710 1202 2301 2309  
GS RATIOS  
RT #STANDING WAVE RATIOS  
AMPLITUDES  
ELECTRICAL PROPERTIES  
SMITH CHART  
TRANSMISSION LINES

STANDING WAVES  
0710 1202 2301 2309  
RT ANTINODES  
BEAT FREQUENCIES

FREQUENCIES  
HARMONICS  
NODES (STANDING WAVES)  
% RADIATION  
RESONANT FREQUENCIES  
VIBRATION  
WAVELENGTHS  
% WAVES

STANDS  
USE SUPPORTS

STANNATES  
0603 1704 1804  
GS TIN COMPOUNDS  
#STANNATES  
RT % OXYGEN COMPOUNDS

STANNIDES  
0603 1804  
GS TIN COMPOUNDS  
#STANNIDES  
..NIOBIUM STANNIDES  
RT TIN ALLOYS

STANTON NUMBER  
1202 1203 3303 3304 3501  
GS RATIOS  
-DIMENSIONLESS NUMBERS  
#STANTON NUMBER  
RT FORCED CONVECTION  
HEAT TRANSFER

STAPHYLOCOCCUS  
0407 0412  
GS MICROORGANISMS  
.BACTERIA  
#STAPHYLOCOCCUS  
RT PLEUROTIN

STAR CATALOGS  
USE ASTRONOMICAL CATALOGS

STAR CLUSTERS  
3001 3003  
GS CELESTIAL BODIES  
#STAR CLUSTERS  
..GLOBAL CLUSTERS  
..OPEN CLUSTERS  
...PLEIADES CLUSTER  
...PRAESEPE STAR CLUSTERS  
RT BARRED GALAXIES  
BINARY STARS  
% CLUSTERS  
COLOR-MAGNITUDE DIAGRAM

DISK GALAXIES  
ELLIPTICAL GALAXIES  
GALACTIC CLUSTERS  
GALAXIES  
IRREGULAR GALAXIES  
MAGELLANIC CLOUDS  
METALLICITY  
SOLAR NEIGHBORHOOD  
STARS  
STELLAR SYSTEMS  
VIRGO GALACTIC CLUSTER

STAR DISTRIBUTION  
1412 3001  
UF STAR FIELDS  
GS DISTRIBUTION (PROPERTY)  
-SPATIAL DISTRIBUTION  
-STAR DISTRIBUTION  
-VERTICAL DISTRIBUTION  
-STAR DISTRIBUTION  
ANGULAR DISTRIBUTION  
ASTROLABES  
BARRED GALAXIES  
COSMOLOGY  
GALACTIC CLUSTERS  
GALACTIC EVOLUTION  
GALACTIC HALOS  
GLOBAL CLUSTERS  
MASS DISTRIBUTION  
RADIAL DISTRIBUTION  
STAR FORMATION  
STELLAR SYSTEMS  
VIRGO GALACTIC CLUSTER

STAR FIELDS  
USE STAR DISTRIBUTION

STAR FORMATION  
3002  
GS EVOLUTION (DEVELOPMENT)  
-STELLAR EVOLUTION  
-STAR FORMATION  
ASTROPHYSICS  
COOLING FLOWS (ASTROPHYSICS)  
COSMOLOGY  
EARLY STARS  
HYDROGEN CLOUDS  
INTERSTELLAR GAS  
INTERSTELLAR MATTER  
MOLECULAR CLOUDS  
NEBULAE  
NUCLEAR FUSION  
PRE-MAIN SEQUENCE STARS  
PROTOSTARS

[illegible]

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

|                                                           |                                                                                                                                                                                |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STATE EQUATIONS<br>USE EQUATIONS OF STATE                 | MAXWELL-MOHR METHOD<br>SAINT VENANT PRINCIPLE                                                                                                                                  | RT                                                | ELECTRIC GENERATORS                                                                                                                                                                                                                                                                                                                                                                                      |
| STATE ESTIMATION<br>1901<br>RT                            | STATIC DISCHARGERS<br>2304<br>UF<br>GS                                                                                                                                         | STATIC LOADS<br>2308 3203<br>UF<br>GS             | DEADWEIGHT<br>LOADS (FORCES)<br>#STATIC LOADS                                                                                                                                                                                                                                                                                                                                                            |
| RT                                                        | ALGORITHMS<br>KALMAN FILTERS<br>LINEAR SYSTEMS<br>ORBITAL POSITION ESTIMATION<br>STATE VECTORS<br>STOCHASTIC PROCESSES                                                         | RT                                                | AERODYNAMIC LOADS<br>AXIAL COMPRESSION LOADS<br>AXIAL LOADS<br>BALLAST (MASS)<br>BENDING MOMENTS<br>COMPRESSION LOADS<br>CRITICAL LOADING<br>DYNAMIC LOADS<br>EDGE LOADING<br>LOADING MOMENTS<br>MASS DISTRIBUTION<br>MOMENT DISTRIBUTION<br>PRESSURE DISTRIBUTION<br>RANDOM LOADS<br>SAINT VENANT PRINCIPLE<br>STATIC CHARACTERISTICS<br>STRUCTURAL DESIGN CRITERIA<br>TRANSVERSE LOADS<br>WING LOADING |
| STATE VECTORS<br>2308 2311<br>GS                          | STATE VECTORS<br>2308 2311<br>GS                                                                                                                                               | RT                                                | ATMOSPHERIC ELECTRICITY<br>ATMOSPHERICS<br>ELECTRIC CORONA<br>ELECTRIC FIELDS<br>ELECTRIC POTENTIAL<br>ELECTRIC SPARKS<br>ELECTROSTATIC CHARGE<br>ELECTROSTATICS<br>LIGHTNING<br>OPEN CIRCUIT VOLTAGE<br>SPACE CHARGE                                                                                                                                                                                    |
| RT                                                        | VECTOR SPACES<br>.. VECTORS (MATHEMATICS)<br>.. #STATE VECTORS<br>OBSERVABILITY (SYSTEMS)<br>PHASE-SPACE INTEGRAL<br>STATE ESTIMATION<br>STEADY STATE<br>STRANGE ATTRACTORS    | RT                                                | ALGEBRA<br>.. VECTOR SPACES<br>.. VECTORS (MATHEMATICS)<br>.. #STATE VECTORS<br>OBSERVABILITY (SYSTEMS)<br>PHASE-SPACE INTEGRAL<br>STATE ESTIMATION<br>STEADY STATE<br>STRANGE ATTRACTORS                                                                                                                                                                                                                |
| STATE AERODYNAMIC CHARACTERISTICS<br>0101 0102 2308<br>GS | STATE AERODYNAMIC CHARACTERISTICS<br>0101 0102 2308<br>GS                                                                                                                      | STATIC FIRING<br>1108 2808 3106 3501<br>GS        | CAPTIVE TESTS<br>.. STATIC TESTS<br>.. #STATIC FIRING<br>ENGINE TESTS<br>#STATIC FIRING<br>FIRING (IGNITING)<br>.. TEST FIRING<br>.. #STATIC FIRING<br>GROUND TESTS<br>.. PRELAUNCH TESTS<br>.. #STATIC FIRING<br>ROCKET FIRING                                                                                                                                                                          |
| RT                                                        | AERODYNAMIC CHARACTERISTICS<br>#STATIC AERODYNAMIC CHARACTERISTICS<br>#STATIC AERODYNAMIC CHARACTERISTICS<br>AERODYNAMIC BALANCE<br>AERODYNAMIC STABILITY<br>% CHARACTERISTICS | RT                                                | MODELING<br>#STATIC MODELS<br>APPROXIMATION<br>DYNAMIC MODELS<br>OPTIMIZATION                                                                                                                                                                                                                                                                                                                            |
| STATIC ALTERNATORS<br>0902 0904 2304<br>GS                | STATIC ALTERNATORS<br>0902 0904 2304<br>GS                                                                                                                                     | STATIC PRESSURE<br>1202 1203 1408 2308 3501<br>GS | PRESSURE<br>#STATIC PRESSURE<br>.. HYDROSTATIC PRESSURE<br>ISOSTATIC PRESSURE<br>PITOT TUBES<br>SOUND PRESSURE                                                                                                                                                                                                                                                                                           |
| STATIC CHARACTERISTICS<br>3408<br>SN                      | STATIC CHARACTERISTICS<br>3408<br>SN                                                                                                                                           | RT                                                | ISOSTATIC PRESSURE<br>PITOT TUBES<br>SOUND PRESSURE                                                                                                                                                                                                                                                                                                                                                      |
| GS                                                        | (EXCLUDES STATICS)<br>#STATIC CHARACTERISTICS<br>.. #STATIC AERODYNAMIC CHARACTERISTICS<br>.. STATIC LOADS<br>STATIC STABILITY<br>STATIC TESTS                                 | STATIC STABILITY<br>0101 0102 2308<br>GS          | STABILITY<br>#STATIC STABILITY<br>.. DIMENSIONAL STABILITY<br>.. STRUCTURAL STABILITY<br>.. SHELL STABILITY<br>AIRCRAFT STABILITY<br>COUNTERBALANCES<br>DRIFT (INSTRUMENTATION)<br>DYNAMIC STABILITY                                                                                                                                                                                                     |
| STATE DEFORMATION<br>2308 3203<br>GS                      | STATE DEFORMATION<br>2308 3203<br>GS                                                                                                                                           | RT                                                | STABILITY<br>#STATIC STABILITY<br>.. DIMENSIONAL STABILITY<br>.. STRUCTURAL STABILITY<br>.. SHELL STABILITY<br>AIRCRAFT STABILITY<br>COUNTERBALANCES<br>DRIFT (INSTRUMENTATION)<br>DYNAMIC STABILITY                                                                                                                                                                                                     |
| RT                                                        | DEFORMATION<br>#STATIC DEFORMATION<br>CREEP PROPERTIES                                                                                                                         | RT                                                | STABILITY<br>#STATIC STABILITY<br>.. DIMENSIONAL STABILITY<br>.. STRUCTURAL STABILITY<br>.. SHELL STABILITY<br>AIRCRAFT STABILITY<br>COUNTERBALANCES<br>DRIFT (INSTRUMENTATION)<br>DYNAMIC STABILITY                                                                                                                                                                                                     |

# NASA THESAURUS HIERARCHICAL UPDATE

MAGNETOHYDROSTATICS  
 STATIC CHARACTERISTICS  
 STORAGE STABILITY  
 STRATIFICATION  
 SURFACE STABILITY

STATIC TESTS  
 1108 2808 3106 3501  
 SN (ENCOMPASSES MATERIALS, ENGINE,  
 AND VEHICLE TESTS)

GS CAPTIVE TESTS  
 #STATIC TESTS  
 ..STATIC FIRING  
 ..COLD FLOW TESTS  
 COMPRESSION TESTS  
 CREEP TESTS  
 DYNAMIC TESTS  
 ENGINE TESTS  
 FATIGUE TESTS  
 GROUND TESTS  
 HARDNESS TESTS  
 INSPECTION  
 LOAD TESTS

% MATERIALS TESTS  
 MISSILE TESTS  
 NONDESTRUCTIVE TESTS  
 PREFIRING TESTS  
 PRELAUNCH TESTS  
 QUALITY CONTROL  
 RESONANCE TESTING  
 STATIC CHARACTERISTICS  
 TENSILE TESTS  
 TEST FIRING  
 % TESTS  
 VIBRATION TESTS  
 WEAR TESTS

STATIC THRUST  
 0101 2308 2808  
 GS THRUST  
 #STATIC THRUST  
 JET THRUST  
 ROCKET THRUST

STATICS  
 1202 2308  
 GS #STATICS  
 ..AEROSTATICS  
 ..ELECTROSTATICS  
 ..HYDROSTATICS  
 ..MAGNETOHYDROSTATICS  
 RT % DYNAMICS  
 ELASTOSTATICS  
 % EQUILIBRIUM  
 FLUID MECHANICS

## % MECHANICS (PHYSICS)

STATIONARY ORBITS  
 1904 3006 3107 3009  
 GS ORBITS  
 ..CIRCULAR ORBITS  
 ..#STATIONARY ORBITS  
 ..EQUATORIAL ORBITS  
 ..#STATIONARY ORBITS  
 ..SPACECRAFT ORBITS  
 ..SATELLITE ORBITS  
 ..#STATIONARY ORBITS  
 RT EARTH ORBITS  
 GEOSYNCHRONOUS ORBITS  
 SYNCHRONOUS SATELLITES  
 TWENTY-FOUR HOUR ORBITS

STATIONKEEPING  
 1102 1106 1109 3109 3406 3503  
 RT GUIDANCE (MOTION)  
 NAVIGATION  
 ORBITAL MECHANICS  
 ORBITS  
 PAYLOAD RETRIEVAL (STS)  
 POSITIONING  
 SATELLITE CONSTELLATIONS  
 SPACECRAFT CONTROL

STATIONS  
 1103 1106 1108 1109 1406 1409 3109  
 GS #STATIONS  
 ..CREW WORKSTATIONS  
 ..CREW EXPERIMENT STATIONS  
 ..CREW OBSERVATION STATIONS  
 ..GROUND STATIONS  
 ..DEEP SPACE INSTRUMENTATION  
 FACILITY  
 ..EARTH TERMINALS  
 ..INTEGRATED MISSION CONTROL CENTER  
 ..POLYSTATION DOPPLER TRACKING  
 SYSTEM  
 ..SPACE DETECTION AND TRACKING  
 SYSTEM

..STDN (NETWORK)  
 ..HYDROELECTRIC POWER STATIONS  
 ..PAYLOAD STATIONS  
 ..SPACE STATIONS  
 ..COLUMBUS SPACE STATION  
 ..HALO ORBIT SPACE STATION  
 ..MAN TENDED FREE FLYERS  
 ..MIR SPACE STATION  
 ..ORBITING LUNAR STATIONS  
 ..SALYUT SPACE STATION  
 ..SKYLAB 1  
 ..SKYLAB 2

..SKYLAB 3  
 ..SKYLAB 4  
 ..SPACE OPERATIONS CENTER (NASA)  
 ..SPACE STATION FREEDOM  
 ..SPACE STATION POLAR PLATFORMS  
 ..TRACKING STATIONS  
 ..DEEP SPACE INSTRUMENTATION  
 FACILITY  
 ..GLOBAL TRACKING NETWORK  
 ..POLYSTATION DOPPLER TRACKING  
 SYSTEM  
 ..SPACE DETECTION AND TRACKING  
 SYSTEM  
 ..STDN (NETWORK)  
 ..WEATHER STATIONS  
 ..AUTOMATIC WEATHER STATIONS  
 ..WORKSTATIONS  
 RT % BASES  
 % FACILITIES  
 LUNAR BASES  
 MILITARY AIR FACILITIES  
 PLANETARY BASES  
 POSITION (LOCATION)  
 SPACE BASES  
 SPACE FLIGHT TRACKING AND DATA  
 NETWORK

STATISTICAL ANALYSIS  
 1902 1905 4001  
 GS #STATISTICAL ANALYSIS  
 ..AMPLITUDE DISTRIBUTION ANALYSIS  
 ..CORRELATION COEFFICIENTS  
 ..DISCRIMINANT ANALYSIS (STATISTICS)  
 ..FACTOR ANALYSIS  
 ..GOODNESS OF FIT  
 ..LIKELIHOOD RATIO  
 ..MAXWELL-BOLTZMANN DENSITY FUNCTION  
 ..NONPARAMETRIC STATISTICS  
 ..POISSON DENSITY FUNCTIONS  
 ..PROBABILITY DENSITY FUNCTIONS  
 ..NORMAL DENSITY FUNCTIONS  
 ..PEARSON DISTRIBUTIONS  
 ..RAYLEIGH DISTRIBUTION  
 ..WEIBULL DENSITY FUNCTIONS  
 ..PROBABILITY DISTRIBUTION FUNCTIONS  
 ..QUANTILES  
 ..SEQUENTIAL ANALYSIS  
 ..STANDARD DEVIATION  
 ..STATISTICAL CORRELATION  
 ..STATISTICAL DECISION THEORY  
 ..STATISTICAL TESTS  
 ..KOLMOGOROV-SMIRNOV TEST  
 ..MANN-WHITNEY-WILCOXON U TEST  
 ..RANK TESTS  
 ..VARIANCE (STATISTICS)

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | % ANALYSIS OF VARIANCE<br>..MULTIVARIATE STATISTICAL ANALYSIS<br>...BIVARIATE ANALYSIS<br>...COVARIANCE<br>...REGRESSION ANALYSIS<br>...ANALYZING<br>% APPLICATIONS OF MATHEMATICS<br>APPROXIMATION<br>AUTOREGRESSIVE PROCESSES<br>BINOMIAL THEOREM<br>BIOMETRICS<br>CENSORED DATA (MATHEMATICS)<br>CHARTS<br>CHEBYSHEV APPROXIMATION<br>CLUSTER ANALYSIS<br>COEFFICIENTS<br>CONFIDENCE<br>CONFIDENCE LIMITS<br>CONTINUITY (MATHEMATICS)<br>CORRELATION                                                                                                                                                                                              | PARAMETER IDENTIFICATION<br>PROBABILITY THEORY<br>QUALITY CONTROL<br>QUANTILES<br>QUEUEING THEORY<br>RANDOM PROCESSES<br>RELIABILITY<br>ROOT-MEAN-SQUARE ERRORS<br>SAMPLING<br>% STATISTICS<br>STOCHASTIC PROCESSES<br>SYSTEM IDENTIFICATION<br>SYSTEMS ANALYSIS<br>SYSTEMS ENGINEERING<br>TABLES (DATA)<br>TELECONNECTIONS (METEOROLOGY)<br>TRAVELING SALESMAN PROBLEM<br>TREND ANALYSIS<br>WIENER FILTERING<br>YANG-MILLS THEORY                                                                                                                                                                                                                                                                                                                                             | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | BINOMIAL THEOREM<br>CENSORED DATA (MATHEMATICS)<br>COMPLEXITY<br>CURVE FITTING<br>% DISTRIBUTION<br>DISTRIBUTION (PROPERTY)<br>DISTRIBUTION FUNCTIONS<br>DISTRIBUTION MOMENTS<br>ERROR FUNCTIONS<br>EVENTS<br>EXPECTANCY HYPOTHESIS<br>FORECASTING<br>GAMMA FUNCTION<br>GOODNESS OF FIT<br>KOLMOGOROV-SMIRNOV TEST<br>KURTOSIS<br>MATHEMATICAL MODELS<br>OUTLIERS (STATISTICS)<br>PROBABILITY THEORY<br>QUALITY CONTROL<br>QUANTILES<br>QUANTUM THEORY<br>QUANTILES<br>RELIABILITY<br>SCATTERING<br>SIZE DISTRIBUTION |
| %  | DATA<br>DATA CORRELATION<br>DECISION THEORY<br>DISCRETE FUNCTIONS<br>DISPERSION<br>ECONOMICS<br>ESTIMATES<br>ESTIMATING<br>EVENTS<br>EXPECTANCY HYPOTHESIS<br>EXPERIMENT DESIGN<br>EXPONENTIAL FUNCTIONS<br>EXTRAPOLATION<br>FACTORIAL DESIGN<br>FAILURE ANALYSIS<br>FORECASTING<br>GAME THEORY<br>GAUSS-MARKOV THEOREM<br>GRAPHS (CHARTS)<br>INFORMATION THEORY<br>INSPECTION<br>INTERPOLATION<br>LINEAR PREDICTION<br>MANAGEMENT<br>% MATHEMATICS<br>MAXIMUM ENTROPY METHOD<br>MEAN<br>MEDIAN (STATISTICS)<br>MILLS RATIO<br>MINIMUM VARIANCE ORBIT<br>DETERMINATION<br>MONTE CARLO METHOD<br>MTBF<br>OPERATIONS RESEARCH<br>OUTLIERS (STATISTICS) | STATISTICAL COMMUNICATION THEORY<br>USE COMMUNICATION THEORY<br><br>STATISTICAL CORRELATION<br>1902 1905<br>GS CORRELATION<br>#STATISTICAL CORRELATION<br>STATISTICAL ANALYSIS<br>#STATISTICAL CORRELATION<br>CORRELATION COEFFICIENTS<br>DATA CORRELATION<br>ECONOMETRICS<br>EVALUATION<br>QUALITY CONTROL<br>% STATISTICS<br>TELECONNECTIONS (METEOROLOGY)<br><br>STATISTICAL DECISION THEORY<br>1902 1905<br>GS DECISION THEORY<br>#STATISTICAL DECISION THEORY<br>STATISTICAL ANALYSIS<br>#STATISTICAL DECISION THEORY<br>% GAME THEORY<br>THEORIES<br><br>STATISTICAL DISTRIBUTIONS<br>1902 1905<br>UF RANDOM DISTRIBUTIONS<br>GS #STATISTICAL DISTRIBUTIONS<br>.BRIGHTNESS DISTRIBUTION<br>.PEARSON DISTRIBUTIONS<br>.PROBABILITY DISTRIBUTION<br>.RAYLEIGH DISTRIBUTION | STATISTICAL MECHANICS<br>1902 1905 2308<br>RT BOLTZMANN DISTRIBUTION<br>BOLTZMANN TRANSPORT EQUATION<br>CLASSICAL MECHANICS<br>CLOSURE LAW<br>CONTINUUM MECHANICS<br>ENERGY DISTRIBUTION<br>FLUCTUATION THEORY<br>FUNCTION SPACE<br>ISING MODEL<br>LIOUVILLE EQUATIONS<br>MACROSCOPIC EQUATIONS<br>MALKUS THEORY<br>MANY BODY PROBLEM<br>% MAXWELL-BOLTZMANN DENSITY FUNCTION<br>MECHANICS (PHYSICS)<br>MOLECULAR DYNAMICS<br>ONSAGER PHENOMENOLOGICAL<br>COEFFICIENT<br>QUANTUM MECHANICS<br>QUANTUM THEORY<br>RENORMALIZATION GROUP METHODS<br>THERMODYNAMIC EQUILIBRIUM<br>WEIGHTING FUNCTIONS<br>STATISTICAL MOMENTS<br>USE DISTRIBUTION MOMENTS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                          |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STATISTICAL PROBABILITY<br>USE PROBABILITY THEORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ENTROPY (STATISTICS)<br>ESTIMATES<br>ESTIMATING<br>FERMI-DIRAC STATISTICS<br>INFORMATION THEORY<br>NONPARAMETRIC STATISTICS<br>POPULATIONS<br>PROBABILITY THEORY<br>QUANTILES<br>QUANTUM STATISTICS<br>RANDOM VARIABLES<br>RELIABILITY<br>SAMPLING<br>STATISTICAL ANALYSIS<br>STATISTICAL CORRELATION<br>STOCHASTIC PROCESSES<br>SURVEYS<br>SYSTEMS ENGINEERING<br>TABLES (DATA)<br>TIME SERIES ANALYSIS | GS | STATIONS<br>.GROUND STATIONS<br>.#STDN (NETWORK)<br>.TRACKING STATIONS<br>.#STDN (NETWORK)<br>TRACKING NETWORKS<br>#STDN (NETWORK)<br>DATA ACQUISITION<br>GLOBAL TRACKING NETWORK<br>MINITRACK SYSTEM<br>OPTICAL TRACKING<br>RANGE AND RANGE RATE TRACKING<br>SATELLITE TRACKING<br>SPACE DETECTION AND TRACKING SYSTEM<br>SPACE FLIGHT TRACKING AND DATA<br>NETWORK                                                                                                                                                                                                                                                                                                                             |
| STATISTICAL TESTS<br>1902 1905 3406<br>UF BRUCETON TEST<br>GS STATISTICAL ANALYSIS<br>#STATISTICAL TESTS<br>..KOLMOGOROV-SMIRNOV TEST<br>..MANN-WHITNEY-WILCOXON U TEST<br>..RANK TESTS<br>RT CHARTS<br>CONFIDENCE LIMITS<br>CURVE FITTING<br>% DATA<br>ESTIMATES<br>ESTIMATING<br>FACTOR ANALYSIS<br>GOODNESS OF FIT<br>HETEROGENEITY<br>HOMOGENEITY<br>LIKELIHOOD RATIO<br>NORMALITY<br>NULL HYPOTHESIS<br>OUTLIERS (STATISTICS)<br>QUALITY CONTROL<br>RANGE (EXTREMES)<br>REGRESSION ANALYSIS<br>RELIABILITY<br>SIGNIFICANCE<br>% TESTS<br>VALIDITY | STATISTICAL TESTS<br>0202 1504<br>GS TURBOMACHINE BLADES<br>#STATOR BLADES<br>RT % BLADES<br>COMPRESSOR BLADES<br>ROTOR BLADES (TURBOMACHINERY)<br>STATORS<br>TURBINE BLADES<br>VANES                                                                                                                                                                                                                    | RT | STEADY FLOW<br>1202 1203<br>GS FLUID FLOW<br>#STEADY FLOW<br>..COUETTE FLOW<br>..HARTMANN FLOW<br>BELTRAMI FLOW<br>CONTINUITY EQUATION<br>CRITICAL FLOW<br>CROCCO METHOD<br>EQUILIBRIUM FLOW<br>% FLOW CHARACTERISTICS<br>FLOW GEOMETRY<br>FLOW STABILITY<br>GAS FLOW<br>HEAT TRANSMISSION<br>HYDRODYNAMIC COEFFICIENTS<br>LAMINAR FLOW<br>LIQUID FLOW<br>LOW TURBULENCE<br>MASS FLOW<br>METHOD OF CHARACTERISTICS<br>MULTIPHASE FLOW<br>NONNEWTONIAN FLOW<br>ORIFICE FLOW<br>PARALLEL FLOW<br>PIPE FLOW<br>PRESSURE GRADIENTS<br>QUASI-STEADY STATES<br>SINGLE-PHASE FLOW<br>SOLIDS FLOW<br>STEAM FLOW<br>STOKES FLOW<br>SUBCRITICAL FLOW<br>SUPERCRITICAL FLOW<br>TURBULENCE<br>TURBULENT FLOW |
| STATISTICAL WEATHER FORECASTING<br>1905 2001 2002 2003<br>GS FORECASTING<br>.WEATHER FORECASTING<br>.#STATISTICAL WEATHER FORECASTING<br>METEOROLOGY<br>.WEATHER FORECASTING<br>.#STATISTICAL WEATHER FORECASTING<br>RT LONG RANGE WEATHER FORECASTING<br>NUMERICAL WEATHER FORECASTING                                                                                                                                                                                                                                                                | STATISTICAL WEATHER FORECASTING<br>1905 2001 2002 2003<br>GS FORECASTING<br>.WEATHER FORECASTING<br>.#STATISTICAL WEATHER FORECASTING<br>METEOROLOGY<br>.WEATHER FORECASTING<br>.#STATISTICAL WEATHER FORECASTING<br>RT LONG RANGE WEATHER FORECASTING<br>NUMERICAL WEATHER FORECASTING                                                                                                                  | GS | STAYS<br>USE GUY WIRES<br>STDN (NETWORK)<br>0709<br>UF SATELLITE TRACKING AND DATA ACQ<br>NETWORK<br>SPACECRAFT TRACKING AND DATA<br>NETWORK<br>STADAN (SATELLITE TRACKING NETWORK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| % STATISTICS<br>1902 1905<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT ARRAYS<br>BIOMETRICS<br>CENSUS<br>% DATA<br>DEMOGRAPHY                                                                                                                                                                                                                                                                                                                                                                        | % STATISTICS<br>1902 1905<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT ARRAYS<br>BIOMETRICS<br>CENSUS<br>% DATA<br>DEMOGRAPHY                                                                                                                                                                                                                          | RT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

TWO DIMENSIONAL FLOW  
 UNIFORM FLOW  
 UNSTEADY FLOW  
 STEADY STATE  
 1003 1202 2311  
 RT % EQUILIBRIUM  
 FLUID DYNAMICS  
 METASTABLE STATE  
 STABILITY  
 STATE VECTORS  
 UNSTEADY FLOW  
 UNSTEADY STATE  
 STEADY STATE CREEP  
 2601 3203  
 GS MECHANICAL PROPERTIES  
 .CREEP PROPERTIES  
 .#STEADY STATE CREEP  
 PLASTIC FLOW  
 QUASI-STEADY STATES  
 STEADY STATE FLOW  
 USE EQUILIBRIUM FLOW  
 STEALTH BOMBER  
 USE B-2 AIRCRAFT  
 STEAM  
 0603 1202 3303 3501  
 RT BOILERS  
 FOG  
 SUPERHEATING  
 THERMODYNAMICS  
 WATER  
 WATER VAPOR  
 STEAM FLOW  
 1202  
 GS FLUID FLOW  
 #STEAM FLOW  
 CRITICAL FLOW  
 GAS FLOW  
 LAMINAR FLOW  
 MASS FLOW  
 MULTIPHASE FLOW  
 ORIFICE FLOW  
 PIPE FLOW  
 PIPELINES  
 PRESSURE GRADIENTS  
 SINGLE-PHASE FLOW  
 STEADY FLOW  
 SUBCRITICAL FLOW  
 SUPERCRITICAL FLOW  
 TURBULENT FLOW

UNIFORM FLOW  
 UNSTEADY FLOW  
 STEAM GENERATORS  
 USE BOILERS  
 STEAM TURBINES  
 1504 3303 3501  
 GS TURBOMACHINERY  
 .TURBINES  
 .#STEAM TURBINES  
 RT AXIAL FLOW TURBINES  
 COMBINED CYCLE POWER GENERATION  
 GAS TURBINE ENGINES  
 GAS TURBINES  
 TURBOGENERATORS  
 TWO STAGE TURBINES  
 STEARATES  
 1808  
 GS ESTERS  
 #STEARATES  
 RT SOAPS  
 STEAROTHERMOPHILUS  
 0404 0406 0407  
 GS MICROORGANISMS  
 .BACTERIA  
 ..BACILLUS  
 ..#STEAROTHERMOPHILUS  
 STEATITE  
 USE TALC  
 STEEL STRUCTURES  
 1701 1704 3202 3203  
 GS WELDED STRUCTURES  
 #STEEL STRUCTURES  
 RT COMPOSITE STRUCTURES  
 CONSTRUCTION  
 RIGID STRUCTURES  
 % STRUCTURES  
 STEELS  
 1701 1704  
 GS ALLOYS  
 .IRON ALLOYS  
 .#STEELS  
 ...BAINITIC STEEL  
 ...CARBON STEELS  
 ...LOW CARBON STEELS  
 ...CHROMIUM STEELS  
 ...CROLOY  
 ...HIGH STRENGTH STEELS  
 ....MARAGING STEELS

...NICKEL STEELS  
 ...STAINLESS STEELS  
 ...AUSTENITIC STAINLESS STEELS  
 ...FERRITIC STAINLESS STEELS  
 ...MARTENSITIC STAINLESS STEELS  
 AUSTENITE  
 BAINITE  
 CEMENTITE  
 FERRITES  
 HYDROGEN EMBRITTLEMENT  
 MARTENSITE  
 PEARLITE  
 RT  
 STEEP GRADIENT AIRCRAFT  
 USE V/STOL AIRCRAFT  
 STEEPEST ASCENT METHOD  
 USE STEEPEST DESCENT METHOD  
 STEEPEST DESCENT METHOD  
 0802 1902 1905 2308  
 UF STEEPEST ASCENT METHOD  
 RT CALCULUS OF VARIATIONS  
 DYNAMIC PROGRAMMING  
 % METHODOLOGY  
 MINIMA  
 OPTIMIZATION  
 PARAMETER IDENTIFICATION  
 SYSTEM IDENTIFICATION  
 STEEPNESS  
 USE SLOPES  
 STEERABLE ANTENNAS  
 0701 0705 0709 0901  
 GS ANTENNAS  
 .DIRECTIONAL ANTENNAS  
 .#STEERABLE ANTENNAS  
 ...INERTIALESS STEERABLE ANTENNAS  
 ARRAYS  
 .ANTENNA ARRAYS  
 .#STEERABLE ANTENNAS  
 ...INERTIALESS STEERABLE ANTENNAS  
 PHASED ARRAYS  
 RT RADAR ANTENNAS  
 STEERING  
 0303 1402 1410 2102  
 RT % CONTROL  
 CONTROL ROCKETS  
 CONTROLLABILITY  
 ELECTRON OPTICS  
 % FLIGHT  
 FOCUSING  
 SUSPENSION SYSTEMS (VEHICLES)



[illegible]

|                               |                               |                         |                 |
|-------------------------------|-------------------------------|-------------------------|-----------------|
| ASYMPTOTIC GIANT BRANCH STARS | CONVECTION                    | RT                      | MAGNETIC FIELDS |
| BROWN DWARF STARS             | GRAVITATIONAL COLLAPSE        | %                       | MAGNETOSPHERES  |
| COLOR-MAGNITUDE DIAGRAM       | NUCLEAR FUSION                | STELLAR ATMOSPHERES     |                 |
| COSMOLOGY                     | STARS                         | STELLAR MAGNETIC FIELDS |                 |
| DEGENERATE MATTER             | STELLAR ACTIVITY              |                         |                 |
| GALACTIC EVOLUTION            | STELLAR ATMOSPHERES           |                         |                 |
| HERTZSPRUNG-RUSSELL DIAGRAM   | STELLAR CONVECTION            |                         |                 |
| HORIZONTAL BRANCH STARS       | STELLAR EVOLUTION             |                         |                 |
| INTERSTELLAR EXTINCTION       | STELLAR MODELS                |                         |                 |
| LATE STARS                    | STELLAR PHYSICS               |                         |                 |
| MAIN SEQUENCE STARS           | STELLAR STRUCTURE             |                         |                 |
| NEUTRAL CURRENTS              |                               |                         |                 |
| PLANETARY EVOLUTION           | STELLAR LUMINOSITY            |                         |                 |
| PRE-MAIN SEQUENCE STARS       | 1404 1412 2306 3001           |                         |                 |
| PROTOPLANETS                  | GS ELECTROMAGNETIC PROPERTIES |                         |                 |
| PROTOSTARS                    | . OPTICAL PROPERTIES          |                         |                 |
| RED GIANT STARS               | ..LUMINOSITY                  |                         |                 |
| SOLAR SYSTEM EVOLUTION        | ..#STELLAR LUMINOSITY         |                         |                 |
| STAR FORMATION RATE           | RT BRIGHTNESS                 |                         |                 |
| STELLAR INTERIORS             | BRIGHTNESS DISTRIBUTION       |                         |                 |
| STELLAR PHYSICS               | HERTZSPRUNG-RUSSELL DIAGRAM   |                         |                 |
| SUBGIANT STARS                | HORIZONTAL BRANCH STARS       |                         |                 |
|                               | LIMB BRIGHTENING              |                         |                 |
|                               | LIMB DARKENING                |                         |                 |
|                               | LUMINESCENCE                  |                         |                 |
|                               | MASS TO LIGHT RATIOS          |                         |                 |
|                               | RED DWARF STARS               |                         |                 |
|                               | RED GIANT STARS               |                         |                 |
|                               | STARSPOTS                     |                         |                 |
|                               | STELLAR ACTIVITY              |                         |                 |
|                               | STELLAR COLOR                 |                         |                 |
|                               | STELLAR FLARES                |                         |                 |
|                               | STELLAR PARALLAX              |                         |                 |
|                               | STELLAR PHYSICS               |                         |                 |
|                               | WOLF-RAYET STARS              |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR MAGNETIC FIELDS       |                         |                 |
|                               | 2307 3001 3002                |                         |                 |
|                               | GS MAGNETIC FIELDS            |                         |                 |
|                               | #STELLAR MAGNETIC FIELDS      |                         |                 |
|                               | ..SOLAR MAGNETIC FIELD        |                         |                 |
|                               | ELECTROMAGNETIC FIELDS        |                         |                 |
|                               | INTERSTELLAR MAGNETIC FIELDS  |                         |                 |
|                               | MAGNETIC FIELD CONFIGURATIONS |                         |                 |
|                               | PLASMAS (PHYSICS)             |                         |                 |
|                               | PULSAR MAGNETOSPHERES         |                         |                 |
|                               | STARSPOTS                     |                         |                 |
|                               | STELLAR ACTIVITY              |                         |                 |
|                               | STELLAR CONVECTION            |                         |                 |
|                               | STELLAR MAGNETOSPHERES        |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR MAGNETOSPHERES        |                         |                 |
|                               | 2307 3001 3009                |                         |                 |
|                               | GS #STELLAR MAGNETOSPHERES    |                         |                 |
|                               | .PULSAR MAGNETOSPHERES        |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009                |                         |                 |
|                               | GS #STELLAR INTERIORS         |                         |                 |
|                               | .SOLAR INTERIOR               |                         |                 |
|                               | .STELLAR CORES                |                         |                 |
|                               | ASTROPHYSICS                  |                         |                 |
|                               |                               |                         |                 |
|                               | STELLAR INTERIORS             |                         |                 |
|                               | 3002 3001 3009</              |                         |                 |

# NASA THESAURUS HIERARCHICAL UPDATE

GS EJECTION  
 RT #STELLAR MASS EJECTION  
 ASYPTOTIC GIANT BRANCH STARS  
 CATAclysmic VARIABLES  
 DWARF NOVAE  
 MAGNETIC CLOUDS  
 NOVAE  
 R CORONAE BOREALIS STARS  
 STELLAR ACTIVITY  
 STELLAR ENVELOPES  
 SUPERNOVAE  
 VARIABLE STARS  
 WOLF-RAYET STARS

STELLAR MODELS  
 3001 3009  
 GS MODELS  
 .ASTRONOMICAL MODELS  
 .#STELLAR MODELS  
 RT ASTRONOMY  
 SOLAR NEUTRINOS  
 SOLAR OSCILLATIONS  
 STELLAR COMPOSITION  
 STELLAR INTERIORS  
 SUPERMASSIVE STARS

STELLAR MOTIONS  
 1901 3001 3002  
 GS #STELLAR MOTIONS  
 .STELLAR ORBITS  
 .STELLAR OSCILLATIONS  
 ..SOLAR OSCILLATIONS  
 .STELLAR ROTATION  
 ..SOLAR ROTATION  
 .COMPANION STARS  
 COROTATION  
 DOPPLER EFFECT  
 DOPPLER-FIZEAU EFFECT  
 DOUBLE STARS  
 GALACTIC ROTATION  
 HIPPARCOS SATELLITE  
 % MOTION  
 SIDEREAL TIME  
 STELLAR PARALLAX  
 STELLAR SYSTEMS

STELLAR OCCULTATION  
 3001 3009  
 GS OCCULTATION  
 #STELLAR OCCULTATION  
 RT ECLIPSING BINARY STARS  
 LUNAR OCCULTATION

STELLAR ORBITS  
 1901 3009 3001

SN (EXCLUDES PLANETARY ORBITS)  
 GS ORBITS  
 #STELLAR ORBITS  
 CATAclysmic MOTIONS  
 #STELLAR ORBITS  
 CELESTIAL MECHANICS  
 NEMESIS (STAR)

STELLAR OSCILLATIONS  
 3001  
 GS OSCILLATIONS  
 #STELLAR OSCILLATIONS  
 ..SOLAR OSCILLATIONS  
 STELLAR MOTIONS  
 #STELLAR OSCILLATIONS  
 ..SOLAR OSCILLATIONS  
 ASTRONOMICAL MODELS  
 ASTRONOMY  
 ASTROPHYSICS  
 ATMOSPHERIC MODELS  
 CATAclysmic VARIABLES  
 MIRA VARIABLES  
 STARS  
 STELLAR ACTIVITY  
 SYMBIOTIC STARS  
 VARIABLE STARS

STELLAR PARALLAX  
 1901 3001  
 GS PARALLAX  
 #STELLAR PARALLAX  
 RT ASTROMETRY  
 BINARY STARS  
 HIPPARCOS SATELLITE  
 SOLAR PARALLAX  
 STELLAR LUMINOSITY  
 STELLAR MAGNITUDE  
 STELLAR MOTIONS

STELLAR PHYSICS  
 3001 3002  
 GS ASTROPHYSICS  
 #STELLAR PHYSICS  
 ..SOLAR PHYSICS  
 RT LOCAL THERMODYNAMIC EQUILIBRIUM  
 NUCLEAR ASTROPHYSICS  
 NUCLEAR FUSION  
 % SCIENCE  
 STARQUAKES  
 STELLAR ACTIVITY  
 STELLAR COMPOSITION  
 STELLAR CONVECTION  
 STELLAR EVOLUTION  
 STELLAR FLARES  
 STELLAR INTERIORS

STELLAR LUMINOSITY  
 STELLAR MASS ACCRETION  
 STELLAR RADIATION  
 STELLAR ROTATION  
 STELLAR STRUCTURE  
 SUPERNOVAE

STELLAR RADIATION  
 2309 2402 2903 3001  
 GS EXTRATERRESTRIAL RADIATION  
 #STELLAR RADIATION  
 ..STELLAR WINDS  
 RT COSMIC RAYS  
 ELECTROMAGNETIC RADIATION  
 GALACTIC RADIATION  
 GAMMA RAY BURSTS  
 HERBIG-HARO OBJECTS  
 INTERSTELLAR EXTINCTION  
 INTERSTELLAR RADIATION  
 LIGHT CURVE  
 MICROWAVE EMISSION  
 POLARIZED ELECTROMAGNETIC RADIATION  
 % RADIATION  
 RADIATIVE TRANSFER  
 RADIO BURSTS  
 RADIO STARS  
 SOLAR RADIATION  
 STARSPOTS  
 STELLAR ACTIVITY  
 STELLAR FLARES  
 STELLAR PHYSICS  
 X RAY STARS

STELLAR ROTATION  
 1901 3001 3002  
 GS GYRATION  
 .ROTATION  
 .#STELLAR ROTATION  
 ...SOLAR ROTATION  
 STELLAR MOTIONS  
 #STELLAR ROTATION  
 ..SOLAR ROTATION  
 ANGULAR MOMENTUM  
 COROTATION  
 PLANETARY ROTATION  
 STARQUAKES  
 STELLAR PHYSICS

STELLAR SPECTRA  
 1411 1412 2306 3001  
 GS SPECTRA  
 .RADIATION SPECTRA  
 ..ELECTROMAGNETIC SPECTRA  
 ..#STELLAR SPECTRA  
 ....SOLAR SPECTRA

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                                                                                                                                                                                                                                                             |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | ABSORPTION SPECTRA<br>ASTRONOMICAL SPECTROSCOPY<br>COLOR-COLOR DIAGRAM<br>CONTINUOUS SPECTRA<br>COOL STARS<br>EMISSION SPECTRA<br>F STARS<br>G STARS<br>HERBIG-HARO OBJECTS<br>HERTZSPRUNG-RUSSELL DIAGRAM<br>HORIZONTAL BRANCH STARS<br>INFRARED SPECTRA<br>K STARS<br>LINE SPECTRA<br>MOLECULAR SPECTRA<br>PECULIAR STARS<br>SEYFERT GALAXIES<br>STELLAR COLOR<br>SYMBIOTIC STARS<br>ULTRAVIOLET SPECTRA<br>VISIBLE SPECTRUM<br>X RAY SPECTRA |  | STELLAR INTERIORS<br>STELLAR PHYSICS<br>% STRUCTURES<br>SUPERMASSIVE STARS                                                                                                                                                                                                                                                                                                                                               | GS | NUCLEAR REACTORS<br>.NUCLEAR REACTORS<br>.#STELLARATORS<br>HELICAL WINDINGS<br>HELIOTRONS<br>MAGNETOHYDRODYNAMICS<br>PINCH EFFECT<br>PLASMA CONTROL<br>THERMAL INSTABILITY<br>THERMONUCLEAR POWER GENERATION<br>THERMONUCLEAR REACTIONS<br>TOROIDAL PLASMAS |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR SYSTEMS<br>3001 3002<br>SN (EXCLUDES PLANETARY SYSTEMS)<br>GS #CELESTIAL BODIES<br>#STELLAR SYSTEMS<br>RT BINARY STARS<br>GALACTIC CLUSTERS<br>GALACTIC ROTATION<br>GALACTIC STRUCTURE<br>GALAXIES<br>GRAVITATIONAL COLLAPSE<br>GRAVITATIONAL EFFECTS<br>INTERACTING GALAXIES<br>NEMESIS (STAR)<br>SIGMA ORIONIS<br>STAR CLUSTERS<br>STAR DISTRIBUTION<br>STELLAR GRAVITATION<br>STELLAR MOTIONS<br>TRIPLE STARS | RT | STELLITE (TRADEMARK)<br>1701<br>UF HAYNES STELLITE<br>RT CHROMIUM ALLOYS<br>COBALT ALLOYS<br>TUNGSTEN ALLOYS                                                                                                                                                |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEMS<br>O409<br>RT PLANTS (BOTANY)                                                                                                                                                                                                                                                                                                                                                                                      |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STENCIL PROCESSES<br>1504<br>RT PRINTING<br>REPRODUCTION (COPYING)                                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP FAULTS<br>USE GEOLOGICAL FAULTS                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP FUNCTIONS<br>1902 1905<br>GS FUNCTIONS (MATHEMATICS)<br>#STEP FUNCTIONS<br>RT DYNAMIC RESPONSE<br>% FREQUENCY RESPONSE<br>INTERVALS<br>RAMP FUNCTIONS<br>REACTION TIME<br>% STEPS                                                                                                                                                                                                                                   |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP RECOVERY DIODES<br>O903<br>GS ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>.SEMICONDUCTOR DEVICES<br>...JUNCTION DIODES<br>...STEP RECOVERY DIODES<br>RT SWITCHING                                                                                                                                                                                                                                               |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEPPEES<br>1306<br>GS LANDFORMS                                                                                                                                                                                                                                                                                                                                                                                         |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR TEMPERATURE<br>1408 3001<br>GS TEMPERATURE<br>#STELLAR TEMPERATURE<br>RT COOL STARS<br>STELLAR MASS<br>SYMBIOTIC STARS                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR WINDS<br>2502 2903 3001 3002 3003<br>GS EXTRATERRESTRIAL RADIATION<br>.STELLAR RADIATION<br>.#STELLAR WINDS<br>PARTICLES<br>.CHARGED PARTICLES<br>..ENERGETIC PARTICLES<br>...PLASMAS (PHYSICS)<br>....SPACE PLASMAS<br>.....#STELLAR WINDS<br>CHROMOSPHERE<br>COSMIC PLASMA<br>INTERGALACTIC MEDIA<br>INTERSTELLAR GAS<br>RADIATION PRESSURE<br>SOLAR WIND<br>SOLAR WIND VELOCITY                               | RT |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLARATORS<br>2205 2307 2501                                                                                                                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |
| RT | ABSORPTION SPECTRA<br>ASTRONOMICAL SPECTROSCOPY<br>COLOR-COLOR DIAGRAM<br>CONTINUOUS SPECTRA<br>COOL STARS<br>EMISSION SPECTRA<br>F STARS<br>G STARS<br>HERBIG-HARO OBJECTS<br>HERTZSPRUNG-RUSSELL DIAGRAM<br>HORIZONTAL BRANCH STARS<br>INFRARED SPECTRA<br>K STARS<br>LINE SPECTRA<br>MOLECULAR SPECTRA<br>PECULIAR STARS<br>SEYFERT GALAXIES<br>STELLAR COLOR<br>SYMBIOTIC STARS<br>ULTRAVIOLET SPECTRA<br>VISIBLE SPECTRUM<br>X RAY SPECTRA |  | STELLAR INTERIORS<br>STELLAR PHYSICS<br>% STRUCTURES<br>SUPERMASSIVE STARS                                                                                                                                                                                                                                                                                                                                               | GS | NUCLEAR REACTORS<br>.NUCLEAR REACTORS<br>.#STELLARATORS<br>HELICAL WINDINGS<br>HELIOTRONS<br>MAGNETOHYDRODYNAMICS<br>PINCH EFFECT<br>PLASMA CONTROL<br>THERMAL INSTABILITY<br>THERMONUCLEAR POWER GENERATION<br>THERMONUCLEAR REACTIONS<br>TOROIDAL PLASMAS |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR SYSTEMS<br>3001 3002<br>SN (EXCLUDES PLANETARY SYSTEMS)<br>GS #CELESTIAL BODIES<br>#STELLAR SYSTEMS<br>RT BINARY STARS<br>GALACTIC CLUSTERS<br>GALACTIC ROTATION<br>GALACTIC STRUCTURE<br>GALAXIES<br>GRAVITATIONAL COLLAPSE<br>GRAVITATIONAL EFFECTS<br>INTERACTING GALAXIES<br>NEMESIS (STAR)<br>SIGMA ORIONIS<br>STAR CLUSTERS<br>STAR DISTRIBUTION<br>STELLAR GRAVITATION<br>STELLAR MOTIONS<br>TRIPLE STARS | RT | STELLITE (TRADEMARK)<br>1701<br>UF HAYNES STELLITE<br>RT CHROMIUM ALLOYS<br>COBALT ALLOYS<br>TUNGSTEN ALLOYS                                                                                                                                                |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEMS<br>O409<br>RT PLANTS (BOTANY)                                                                                                                                                                                                                                                                                                                                                                                      |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STENCIL PROCESSES<br>1504<br>RT PRINTING<br>REPRODUCTION (COPYING)                                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP FAULTS<br>USE GEOLOGICAL FAULTS                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP FUNCTIONS<br>1902 1905<br>GS FUNCTIONS (MATHEMATICS)<br>#STEP FUNCTIONS<br>RT DYNAMIC RESPONSE<br>% FREQUENCY RESPONSE<br>INTERVALS<br>RAMP FUNCTIONS<br>REACTION TIME<br>% STEPS                                                                                                                                                                                                                                   |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP RECOVERY DIODES<br>O903<br>GS ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>.SEMICONDUCTOR DEVICES<br>...JUNCTION DIODES<br>...STEP RECOVERY DIODES<br>RT SWITCHING                                                                                                                                                                                                                                               |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEPPEES<br>1306<br>GS LANDFORMS                                                                                                                                                                                                                                                                                                                                                                                         |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR TEMPERATURE<br>1408 3001<br>GS TEMPERATURE<br>#STELLAR TEMPERATURE<br>RT COOL STARS<br>STELLAR MASS<br>SYMBIOTIC STARS                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR WINDS<br>2502 2903 3001 3002 3003<br>GS EXTRATERRESTRIAL RADIATION<br>.STELLAR RADIATION<br>.#STELLAR WINDS<br>PARTICLES<br>.CHARGED PARTICLES<br>..ENERGETIC PARTICLES<br>...PLASMAS (PHYSICS)<br>....SPACE PLASMAS<br>.....#STELLAR WINDS<br>CHROMOSPHERE<br>COSMIC PLASMA<br>INTERGALACTIC MEDIA<br>INTERSTELLAR GAS<br>RADIATION PRESSURE<br>SOLAR WIND<br>SOLAR WIND VELOCITY                               | RT |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLARATORS<br>2205 2307 2501                                                                                                                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |
| RT | ABSORPTION SPECTRA<br>ASTRONOMICAL SPECTROSCOPY<br>COLOR-COLOR DIAGRAM<br>CONTINUOUS SPECTRA<br>COOL STARS<br>EMISSION SPECTRA<br>F STARS<br>G STARS<br>HERBIG-HARO OBJECTS<br>HERTZSPRUNG-RUSSELL DIAGRAM<br>HORIZONTAL BRANCH STARS<br>INFRARED SPECTRA<br>K STARS<br>LINE SPECTRA<br>MOLECULAR SPECTRA<br>PECULIAR STARS<br>SEYFERT GALAXIES<br>STELLAR COLOR<br>SYMBIOTIC STARS<br>ULTRAVIOLET SPECTRA<br>VISIBLE SPECTRUM<br>X RAY SPECTRA |  | STELLAR INTERIORS<br>STELLAR PHYSICS<br>% STRUCTURES<br>SUPERMASSIVE STARS                                                                                                                                                                                                                                                                                                                                               | GS | NUCLEAR REACTORS<br>.NUCLEAR REACTORS<br>.#STELLARATORS<br>HELICAL WINDINGS<br>HELIOTRONS<br>MAGNETOHYDRODYNAMICS<br>PINCH EFFECT<br>PLASMA CONTROL<br>THERMAL INSTABILITY<br>THERMONUCLEAR POWER GENERATION<br>THERMONUCLEAR REACTIONS<br>TOROIDAL PLASMAS |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR SYSTEMS<br>3001 3002<br>SN (EXCLUDES PLANETARY SYSTEMS)<br>GS #CELESTIAL BODIES<br>#STELLAR SYSTEMS<br>RT BINARY STARS<br>GALACTIC CLUSTERS<br>GALACTIC ROTATION<br>GALACTIC STRUCTURE<br>GALAXIES<br>GRAVITATIONAL COLLAPSE<br>GRAVITATIONAL EFFECTS<br>INTERACTING GALAXIES<br>NEMESIS (STAR)<br>SIGMA ORIONIS<br>STAR CLUSTERS<br>STAR DISTRIBUTION<br>STELLAR GRAVITATION<br>STELLAR MOTIONS<br>TRIPLE STARS | RT | STELLITE (TRADEMARK)<br>1701<br>UF HAYNES STELLITE<br>RT CHROMIUM ALLOYS<br>COBALT ALLOYS<br>TUNGSTEN ALLOYS                                                                                                                                                |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEMS<br>O409<br>RT PLANTS (BOTANY)                                                                                                                                                                                                                                                                                                                                                                                      |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STENCIL PROCESSES<br>1504<br>RT PRINTING<br>REPRODUCTION (COPYING)                                                                                                                                                                                                                                                                                                                                                       |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP FAULTS<br>USE GEOLOGICAL FAULTS                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP FUNCTIONS<br>1902 1905<br>GS FUNCTIONS (MATHEMATICS)<br>#STEP FUNCTIONS<br>RT DYNAMIC RESPONSE<br>% FREQUENCY RESPONSE<br>INTERVALS<br>RAMP FUNCTIONS<br>REACTION TIME<br>% STEPS                                                                                                                                                                                                                                   |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEP RECOVERY DIODES<br>O903<br>GS ELECTRONIC EQUIPMENT<br>.SOLID STATE DEVICES<br>.SEMICONDUCTOR DEVICES<br>...JUNCTION DIODES<br>...STEP RECOVERY DIODES<br>RT SWITCHING                                                                                                                                                                                                                                               |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STEPPEES<br>1306<br>GS LANDFORMS                                                                                                                                                                                                                                                                                                                                                                                         |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR TEMPERATURE<br>1408 3001<br>GS TEMPERATURE<br>#STELLAR TEMPERATURE<br>RT COOL STARS<br>STELLAR MASS<br>SYMBIOTIC STARS                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR WINDS<br>2502 2903 3001 3002 3003<br>GS EXTRATERRESTRIAL RADIATION<br>.STELLAR RADIATION<br>.#STELLAR WINDS<br>PARTICLES<br>.CHARGED PARTICLES<br>..ENERGETIC PARTICLES<br>...PLASMAS (PHYSICS)<br>....SPACE PLASMAS<br>.....#STELLAR WINDS<br>CHROMOSPHERE<br>COSMIC PLASMA<br>INTERGALACTIC MEDIA<br>INTERSTELLAR GAS<br>RADIATION PRESSURE<br>SOLAR WIND<br>SOLAR WIND VELOCITY                               | RT |                                                                                                                                                                                                                                                             |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLARATORS<br>2205 2307 2501                                                                                                                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |
| RT | ABSORPTION SPECTRA<br>ASTRONOMICAL SPECTROSCOPY<br>COLOR-COLOR DIAGRAM<br>CONTINUOUS SPECTRA<br>COOL STARS<br>EMISSION SPECTRA<br>F STARS<br>G STARS<br>HERBIG-HARO OBJECTS<br>HERTZSPRUNG-RUSSELL DIAGRAM<br>HORIZONTAL BRANCH STARS<br>INFRARED SPECTRA<br>K STARS<br>LINE SPECTRA<br>MOLECULAR SPECTRA<br>PECULIAR STARS<br>SEYFERT GALAXIES<br>STELLAR COLOR<br>SYMBIOTIC STARS<br>ULTRAVIOLET SPECTRA<br>VISIBLE SPECTRUM<br>X RAY SPECTRA |  | STELLAR INTERIORS<br>STELLAR PHYSICS<br>% STRUCTURES<br>SUPERMASSIVE STARS                                                                                                                                                                                                                                                                                                                                               | GS | NUCLEAR REACTORS<br>.NUCLEAR REACTORS<br>.#STELLARATORS<br>HELICAL WINDINGS<br>HELIOTRONS<br>MAGNETOHYDRODYNAMICS<br>PINCH EFFECT<br>PLASMA CONTROL<br>THERMAL INSTABILITY<br>THERMONUCLEAR POWER GENERATION<br>THERMONUCLEAR REACTIONS<br>TOROIDAL PLASMAS |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | STELLAR SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                           |    |                                                                                                                                                                                                                                                             |

# NASA THESAURUS HIERARCHICAL UPDATE

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|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                                                                                      | #STEPPEES<br>ARID LANDS<br>DESERTIFICATION<br>GRASSLANDS<br>PLAINS                              | PHOTOGRAPHY<br>.STEREOSCOPY<br>.#STEREOPHOTOGRAPHY                                                                                                                                                                                                                                                                 | BACTERICIDES<br>BAKING<br>DECONTAMINATION<br>FUMIGATION<br>GNOTOBIOTICS<br>HOUSEKEEPING (SPACECRAFT)<br>IONIZING RADIATION<br>MERCURY LAMPS<br>PASTEURIZING<br>PURIFICATION<br>ULTRAVIOLET RADIATION                                                 |
| STEPPING MOTORS<br>O904<br>GS                                                                                                                           | MOTORS<br>.ELECTRIC MOTORS<br>.#STEPPING MOTORS<br>ACTUATORS<br>SERVOCONTROL<br>SERVOMECHANISMS | RT<br>AERIAL PHOTOGRAPHY<br>BLACK AND WHITE PHOTOGRAPHY<br>CINEMATOGRAPHY<br>COLOR PHOTOGRAPHY<br>MAPSAT<br>PHOTOGRAMMETRY<br>SPOT (FRENCH SATELLITE)                                                                                                                                                              |                                                                                                                                                                                                                                                      |
| RT                                                                                                                                                      |                                                                                                 | STEREOSCOPIC PHOTOGRAPHY<br>USE STEREOPHOTOGRAPHY                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                      |
| STEPPING SWITCHES<br>O902<br>GS                                                                                                                         | SWITCHES<br>.ELECTRIC SWITCHES<br>.#STEPPING SWITCHES                                           | STEREOSCOPIC VISION<br>O404 O408<br>GS VISION<br>.#STEREOSCOPIC VISION<br>RT BINOCULAR VISION<br>STEREOSCOPY                                                                                                                                                                                                       | STERILIZATION EFFECTS<br>O504 1505<br>RT<br>CHEMICAL EFFECTS<br>CORROSION<br>DECONTAMINATION<br>DEGRADATION<br>DEOXIFICATION<br>% EFFECTS<br>RADIATION EFFECTS<br>SPACECRAFT STERILIZATION<br>TEMPERATURE EFFECTS<br>THERMAL DEGRADATION             |
| % STEPS<br>O202 1102 1305 1902 3203 3406<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                       |                                                                                                 | STEREOSCOPY<br>1406 3501<br>GS IMAGERY<br>.#STEREOSCOPY<br>..STEREOPHOTOGRAPHY<br>PHOTOGRAPHY<br>.#STEREOSCOPY<br>..STEREOPHOTOGRAPHY<br>RT STEREOSCOPIC VISION                                                                                                                                                    | STERNS<br>USE AFTERBODIES                                                                                                                                                                                                                            |
| RT                                                                                                                                                      | BACKWARD FACING STEPS<br>PROGRAMMING (SCHEDULING)<br>STAIRSTEPS<br>STEP FUNCTIONS               |                                                                                                                                                                                                                                                                                                                    | STERNUM<br>O404<br>GS ANATOMY<br>.MUSCULOSKELETAL SYSTEM<br>..BONES<br>..#STERNUM<br>RT THORAX                                                                                                                                                       |
| STEREOCHEMISTRY<br>O601 O603 2401 2404 2406<br>RT CARBOHYDRATES<br>% CHEMISTRY<br>ISOMERS<br>OPTICAL ACTIVITY<br>SPATIAL DISTRIBUTION<br>X RAY ANALYSIS |                                                                                                 | STEREOTELEVISION<br>O702 O710<br>GS COMMUNICATION EQUIPMENT<br>#STEREOTELEVISION<br>TELECOMMUNICATION<br>#STEREOTELEVISION<br>TELEVISION SYSTEMS<br>#STEREOTELEVISION<br>CLOSED CIRCUIT TELEVISION<br>COLOR TELEVISION<br>COMMUNICATING<br>EDUCATIONAL TELEVISION<br>SATELLITE TELEVISION<br>SPACECRAFT TELEVISION | STERIODS<br>O403 O405 1808<br>GS ORGANIC COMPOUNDS<br>.LIPIDS<br>.#STERIODS<br>...CHOLESTEROL<br>...CORTICOSTEROIDS<br>...ALDOSTERONE<br>...HYDROXYCORTICOSTEROID<br>...CORTISONE<br>...ESTROGENS<br>...PROSTAGLANDINS<br>RT ANTIBIOTICS<br>HORMONES |
| STEREOGRAPHY<br>USE STEREOPHOTOGRAPHY                                                                                                                   |                                                                                                 | RT                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                      |
| STEREOPHONICS<br>1202<br>RT ACOUSTICS<br>HEARING                                                                                                        |                                                                                                 | STERILIZATION<br>O405 O408 O504<br>GS CLEANING<br>#STERILIZATION<br>..CHEMICAL STERILIZATION<br>..SPACECRAFT STERILIZATION<br>AIR PURIFICATION<br>ANTIPOUING<br>ANTISEPTICS                                                                                                                                        | STETHOSCOPES<br>O405 O501<br>GS MEDICAL EQUIPMENT<br>#STETHOSCOPES                                                                                                                                                                                   |
| STEREOPHOTOGRAPHY<br>1407 1412<br>UF STEREOGRAPHY<br>STEREOSCOPIC PHOTOGRAPHY<br>GS IMAGERY<br>.STEREOSCOPY<br>.#STEREOPHOTOGRAPHY                      |                                                                                                 |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                      |

|                      |                            |                     |                                     |                                 |
|----------------------|----------------------------|---------------------|-------------------------------------|---------------------------------|
| RT                   | PHYSICIANS                 | RT                  | DYES                                | ULTRAVIOLET LASERS              |
|                      | STIELTJES INTEGRAL         |                     | HEXANITROSTILBENE                   |                                 |
| 1902                 | ANALYSIS (MATHEMATICS)     | STILLS              |                                     | STIMULATED EMISSION DEVICES     |
| GS                   | .REAL VARIABLES            | 1202                | 3303 3304                           | 1601                            |
|                      | ..MEASURE AND INTEGRATION  | GS                  | SEPARATORS                          | UF                              |
|                      | ..#STIELTJES INTEGRAL      |                     | #STILLS                             | GS #STIMULATED EMISSION DEVICES |
| RT                   | PROBABILITY THEORY         | RT                  | CONCENTRATORS                       | .LASERS                         |
|                      |                            |                     | DISTILLATION EQUIPMENT              | ..AIRBORNE LASERS               |
|                      |                            |                     |                                     | ..ARGON LASERS                  |
| STIFF STRUCTURES     |                            |                     |                                     | ..ATMOSPHERIC LASERS            |
| USE RIGID STRUCTURES |                            | STIMULANTS          |                                     | ..CARBON LASERS                 |
|                      |                            | 0405 0408           |                                     | ..CHEMICAL LASERS               |
|                      |                            | GS                  | DRUGS                               | ..HCL LASERS                    |
| STIFFENING           |                            |                     | #STIMULANTS                         | ..CONTINUOUS WAVE LASERS        |
| 3202                 |                            |                     | ..ATROPINE                          | ..DISTRIBUTED FEEDBACK LASERS   |
| RT                   | REINFORCEMENT (STRUCTURES) |                     | ..CAFFEINE                          | ..FREE ELECTRON LASERS          |
|                      | RIBS (SUPPORTS)            |                     | ..CENTRAL NERVOUS SYSTEM STIMULANTS | ..GAMMA RAY LASERS              |
|                      | WEBS (SUPPORTS)            |                     | ..NORADRENALINE                     | ..GAS LASERS                    |
|                      |                            |                     | ..NOREPINEPHRINE                    | ..CARBON DIOXIDE LASERS         |
| STIFFNESS            |                            | RT                  | AMINOPHYLLINE                       | ..CARBON MONOXIDE LASERS        |
| 2308 3203            |                            |                     | EPINEPHRINE                         | ..DF LASERS                     |
| GS                   | MECHANICAL PROPERTIES      |                     | STRYCHNINE                          | ..EXCIMER LASERS                |
|                      | #STIFFNESS                 |                     |                                     | ..HCL LASERS                    |
| RT                   | BENDING                    |                     |                                     | ..HCL ARGON LASERS              |
|                      | DEFORMATION                |                     |                                     | ..HCN LASERS                    |
|                      | FLEXIBILITY                |                     |                                     | ..HELIUM-NEON LASERS            |
|                      | MODULUS OF ELASTICITY      |                     |                                     | ..HF LASERS                     |
| %                    | RIGIDITY                   |                     |                                     | ..KRYPTON FLUORIDE LASERS       |
|                      | SOFTNESS                   |                     |                                     | ..NITROGEN LASERS               |
|                      | STRUCTURAL STABILITY       |                     |                                     | ..TEA LASERS                    |
|                      |                            |                     |                                     | ..ULTRAVIOLET LASERS            |
| STIFFNESS MATRIX     |                            |                     |                                     | ..XENON CHLORIDE LASERS         |
| 1902 2308            |                            | STIMULATED EMISSION |                                     | ..XENON FLUORIDE LASERS         |
| GS                   | ALGEBRA                    | GS                  | EMISSION                            | ..GASDYNAMIC LASERS             |
|                      | .VECTOR SPACES             | RT                  | #STIMULATED EMISSION                | ..GLASS LASERS                  |
|                      | ..MATRICES (MATHEMATICS)   |                     | ARGON LASERS                        | ..HIGH POWER LASERS             |
|                      | ..#STIFFNESS MATRIX        |                     | CARBON DIOXIDE LASERS               | ..NOVA LASER SYSTEM             |
| RT                   | STRUCTURAL ANALYSIS        |                     | CARBON LASERS                       | ..SHIVA LASER SYSTEM            |
|                      | STRUCTURAL MEMBERS         |                     | COHERENT ELECTROMAGNETIC RADIATION  | ..INFRARED LASERS               |
|                      |                            |                     | COHERENT LIGHT                      | ..INJECTION LASERS              |
|                      |                            |                     | ELECTRON EMISSION                   | ..IODINE LASERS                 |
|                      |                            |                     | ELECTRON PUMPING                    | ..LIQUID LASERS                 |
|                      |                            |                     | GALLIUM ARSENIDE LASERS             | ..METAL VAPOR LASERS            |
|                      |                            |                     | GAS LASERS                          | ..NEODYMIUM LASERS              |
|                      |                            |                     | GAS MASERS                          | ..NUCLEAR PUMPED LASERS         |
|                      |                            |                     | HCN LASERS                          | ..ORGANIC LASERS                |
|                      |                            |                     | INTERSTELLAR MASERS                 | ..DYE LASERS                    |
|                      |                            |                     | LASERS                              | ..PLASMA DYNAMIC LASERS         |
| STIGMATISM           |                            |                     | LIGHT EMISSION                      | ..PULSED LASERS                 |
| 0405 0408 2310       |                            |                     | MASERS                              | ..Q SWITCHED LASERS             |
| GS                   | ELECTROMAGNETIC PROPERTIES |                     | NUCLEAR PUMPING                     | ..ULTRASHORT PULSED LASERS      |
|                      | .OPTICAL PROPERTIES        |                     | OPTICAL PUMPING                     | ..ULTRAVIOLET LASERS            |
|                      | ..#STIGMATISM              |                     | PARTICLE EMISSION                   | ..RAMAN LASERS                  |
| RT                   | ASTIGMATISM                |                     | PHOTOELECTRIC EMISSION              | ..RARE GAS-HALIDE LASERS        |
|                      | FOCUSING                   |                     | POPULATION INVERSION                | ..TEA LASERS                    |
|                      | LENS DESIGN                |                     | RAPID BALLISTICS IDENTIFICATION     | ..TWO-WAVELENGTH LASERS         |
|                      | LENSES                     |                     | RARE GAS-HALIDE LASERS              | ULTRASHORT PULSED LASERS        |
|                      |                            |                     | SELF SUSTAINED EMISSION             |                                 |
|                      |                            |                     | SURFACE EMITTING LASERS             |                                 |
| STILBENE             |                            |                     | TEA LASERS                          |                                 |
| 1808                 |                            |                     | TWO-WAVELENGTH LASERS               |                                 |
| GS                   | ORGANIC COMPOUNDS          |                     | ULTRASHORT PULSED LASERS            |                                 |
|                      | .HYDROCARBONS              |                     |                                     |                                 |
|                      | ..#STILBENE                |                     |                                     |                                 |

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# NASA THESAURUS HIERARCHICAL UPDATE

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| % REDUCTION<br>RETARDING<br>SEALING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | HANDLING EQUIPMENT<br>INVENTORIES<br>INVENTORY CONTROLS<br>INVENTORY MANAGEMENT<br>ION STORAGE<br>LIQUID FILLED SHELLS<br>LOGISTICS<br>LOGISTICS MANAGEMENT<br>MAGNETIC STORAGE<br>MATERIALS HANDLING<br>MISSILE SILOS<br>MISSILE STORAGE<br>PACKAGING<br>PIPELINES<br>PRESERVING<br>PROPELLANT STORAGE<br>RACKS (FRAMES)<br>RECORDING<br>RESERVES<br>RETAINING<br>SAFETY<br>SPACE STORAGE<br>STOCKPILING<br>STORAGE TANKS<br>STORAGE (ONBOARD EQUIPMENT)<br>UNDERGROUND STORAGE<br>WASTE DISPOSAL<br>WING-FUSELAGE STORES                                                                                                                                 | REGENERATIVE FUEL CELLS<br><br>STORAGE RINGS (PARTICLE ACCELERATORS)<br>2202 2401 2405<br>UF ELECTRON RING ACCELERATORS<br>GS PARTICLE ACCELERATORS<br>.CYCLIC ACCELERATORS<br>..SYNCHROTRONS<br>..#STORAGE RINGS (PARTICLE<br>ACCELERATORS)<br>RT % ACCELERATORS<br>% RINGS<br>SUPERCONDUCTING SUPER COLLIDER                                                                                                                                                                                                 |
| STOPPING POWER<br>2202 2403 2405<br>RT ABSORBERS (MATERIALS)<br>ABSORPTION CROSS SECTIONS<br>% CROSS SECTIONS<br>DENSITY (MASS/VOLUME)<br>NEUTRON CROSS SECTIONS<br>RADIATION ABSORPTION<br>RADIATION SHIELDING<br>SCATTERING CROSS SECTIONS                                                                                                                                                                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| STORABLE PROPELLANTS<br>1103 2701 2702<br>GS CONSUMABLES (SPACECRAFT)<br>#STORABLE PROPELLANTS<br>PROPELLANTS<br>#STORABLE PROPELLANTS<br>CRYOGENIC ROCKET PROPELLANTS<br>GASEOUS ROCKET PROPELLANTS<br>GELLED ROCKET PROPELLANTS<br>GROUND SUPPORT EQUIPMENT<br>HIGH TEMPERATURE PROPELLANTS<br>HYDROCARBON FUELS<br>HYPERGOLIC ROCKET PROPELLANTS<br>LIQUID ROCKET PROPELLANTS<br>PROPELLANT ADDITIVES<br>PROPELLANT DECOMPOSITION<br>PROPELLANT EVAPORATION<br>PROPELLANT SENSITIVITY<br>PROPELLANT STORABILITY<br>PROPELLANT STORAGE<br>ROCKET PROPELLANTS<br>SOLID PROPELLANTS<br>SPACE STORAGE |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| % STORAGE<br>0801 0802 1103 1502 3405<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT BUFFER STORAGE<br>COMPUTER STORAGE DEVICES<br>CORE STORAGE<br>CRYOGENIC FLUID STORAGE<br>DATA STORAGE<br>DISPOSAL<br>DOCUMENT STORAGE<br>ENERGY STORAGE<br>EXTERNAL STORE SEPARATION<br>EXTERNAL STORES<br>FLUID FILLED SHELLS                                                                                                                                                                                                                                  |  | STORAGE BATTERIES<br>0302 0602<br>SN (RECHARGEABLE BATTERIES)<br>UF SECONDARY BATTERIES<br>GS ELECTROCHEMICAL CELLS<br>.ELECTRIC BATTERIES<br>.#STORAGE BATTERIES<br>...LEAD ACID BATTERIES<br>...NICKEL CADMIUM BATTERIES<br>...NICKEL HYDROGEN BATTERIES<br>...NICKEL ZINC BATTERIES<br>...SILVER CADMIUM BATTERIES<br>...SILVER HYDROGEN BATTERIES<br>...SILVER ZINC BATTERIES<br>...ZINC-BROMIDE BATTERIES<br>...ZINC-CHLORINE BATTERIES<br>ALKALINE BATTERIES<br>BATTERY CHARGERS<br>CHARGE EFFICIENCY<br>DRY CELLS<br>ELECTROLYTES<br>METAL AIR BATTERIES<br>NICKEL IRON BATTERIES<br>NONAQUEOUS ELECTROLYTES<br>PRIMARY BATTERIES<br>PULSE CHARGING | STORAGE TANKS<br>1103 2702 3305<br>GS TANKS (CONTAINERS)<br>#STORAGE TANKS<br>RT CRYOGENIC FLUID STORAGE<br>CYLINDRICAL TANKS<br>EXPULSION BLADDERS<br>EXTERNAL TANKS<br>FUEL TANKS<br>PIPELINES<br>PRESSURE VESSELS<br>PROPELLANT TANKS<br>SPACE STORAGE<br>SPHERICAL TANKS<br>% STORAGE<br>TANK GEOMETRY<br>UNDERGROUND STORAGE<br>WING-FUSELAGE STORES<br><br>STORE RELEASE<br>USE EXTERNAL STORE SEPARATION<br><br>STORM DAMAGE<br>1308 2003<br>GS DAMAGE<br>#STORM DAMAGE<br>RT CYCLONES<br>FLOOD CONTROL |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                             |                             |  |  |
|-----------------------------|-----------------------------|--|--|
| PORTABLE EQUIPMENT          |                             |  |  |
| PROVISIONING                |                             |  |  |
| SPACE LOGISTICS             |                             |  |  |
| SPACE RATIONS               |                             |  |  |
| % STORAGE                   |                             |  |  |
| STRAIGHT WINGS              |                             |  |  |
| USE RECTANGULAR WINGS       |                             |  |  |
| STRAIN AGING                |                             |  |  |
| USE PRECIPITATION HARDENING |                             |  |  |
| STRAIN DISTRIBUTION         |                             |  |  |
| 3203                        |                             |  |  |
| GS                          | DISTRIBUTION (PROPERTY)     |  |  |
| RT                          | #STRAIN DISTRIBUTION        |  |  |
|                             | CRACK PROPAGATION           |  |  |
|                             | DEFORMATION                 |  |  |
|                             | ELASTIC DEFORMATION         |  |  |
|                             | FRACTURE MECHANICS          |  |  |
|                             | PLASTIC DEFORMATION         |  |  |
|                             | STRAIN MEASUREMENT          |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS CONCENTRATION        |  |  |
|                             | STRESS DISTRIBUTION         |  |  |
|                             | STRESS-STRAIN RELATIONSHIPS |  |  |
| STRAIN ENERGY METHODS       |                             |  |  |
| 1704                        |                             |  |  |
| GS                          | STRUCTURAL ANALYSIS         |  |  |
|                             | .ENERGY METHODS             |  |  |
|                             | .#STRAIN ENERGY METHODS     |  |  |
| RT                          | % ENERGY                    |  |  |
|                             | % METHODOLOGY               |  |  |
|                             | SEISMIC ENERGY              |  |  |
| STRAIN ENERGY RELEASE RATE  |                             |  |  |
| 3203                        |                             |  |  |
| GS                          | RATES (PER TIME)            |  |  |
| RT                          | #STRAIN ENERGY RELEASE RATE |  |  |
|                             | ELASTIC DEFORMATION         |  |  |
|                             | ELASTIC PROPERTIES          |  |  |
|                             | RELAXATION (MECHANICS)      |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS RELAXATION           |  |  |
| STRAIN FATIGUE              |                             |  |  |
| USE FATIGUE (MATERIALS)     |                             |  |  |
| STRAIN GAGE ACCELEROMETERS  |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 1413 2308 3203 3501         |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .ACCELEROMETERS             |  |  |
| RT                          | #STRAIN GAGE ACCELEROMETERS |  |  |
|                             | PRESSURE GAGES              |  |  |
| STRAIN GAGE BALANCES        |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .INDICATING INSTRUMENTS     |  |  |
|                             | ..WEIGHT INDICATORS         |  |  |
|                             | ..#STRAIN GAGE BALANCES     |  |  |
| RT                          | PRESSURE GAGES              |  |  |
| STRAIN GAGES                |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | #STRAIN GAGES               |  |  |
| RT                          | CABLE FORCE RECORDERS       |  |  |
|                             | DEFORMETERS                 |  |  |
|                             | ELASTOMETERS                |  |  |
|                             | EXTENSOMETERS               |  |  |
|                             | FLIGHT LOAD RECORDERS       |  |  |
|                             | MECHANICAL MEASUREMENT      |  |  |
|                             | PIEZOELECTRIC GAGES         |  |  |
|                             | PRESSURE GAGES              |  |  |
|                             | ROSETTE SHAPES              |  |  |
|                             | SHOCK MEASURING INSTRUMENTS |  |  |
|                             | STRAIN MEASUREMENT          |  |  |
|                             | STRESS MEASUREMENT          |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
|                             | TENSOMETERS                 |  |  |
|                             | TRANSDUCERS                 |  |  |
|                             | WEIGHT INDICATORS           |  |  |
| STRAIN HARDENING            |                             |  |  |
| 1704                        |                             |  |  |
| GS                          | 3203 3404                   |  |  |
|                             | HARDENING (MATERIALS)       |  |  |
|                             | .WORK HARDENING             |  |  |
|                             | .#STRAIN HARDENING          |  |  |
| RT                          | AGING (MATERIALS)           |  |  |
|                             | AGING (METALLURGY)          |  |  |
|                             | PRECIPITATION HARDENING     |  |  |
|                             | RESIDUAL STRESS             |  |  |
|                             | SHOT PEENING                |  |  |
|                             | STRESS RELIEVING            |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
| STRAIN MEASUREMENT          |                             |  |  |
| 1406                        |                             |  |  |
| 3501                        |                             |  |  |
| RT                          | % MEASUREMENT               |  |  |
|                             | SMART STRUCTURES            |  |  |
|                             | STRAIN DISTRIBUTION         |  |  |
|                             | STRAIN GAGES                |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS-STRAIN DIAGRAMS      |  |  |
|                             | STRESS-STRAIN RELATIONSHIPS |  |  |
|                             | STRUCTURAL STRAIN           |  |  |
| STRAIN RATE                 |                             |  |  |
| 3203                        |                             |  |  |
| GS                          | RATES (PER TIME)            |  |  |
| RT                          | #STRAIN ENERGY RELEASE RATE |  |  |
|                             | ELASTIC DEFORMATION         |  |  |
|                             | ELASTIC PROPERTIES          |  |  |
|                             | RELAXATION (MECHANICS)      |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS RELAXATION           |  |  |
| STRAIN FATIGUE              |                             |  |  |
| USE FATIGUE (MATERIALS)     |                             |  |  |
| STRAIN GAGE ACCELEROMETERS  |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 1413 2308 3203 3501         |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .ACCELEROMETERS             |  |  |
| RT                          | #STRAIN GAGE ACCELEROMETERS |  |  |
|                             | PRESSURE GAGES              |  |  |
| STRAIN GAGE BALANCES        |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .INDICATING INSTRUMENTS     |  |  |
|                             | ..WEIGHT INDICATORS         |  |  |
|                             | ..#STRAIN GAGE BALANCES     |  |  |
| RT                          | PRESSURE GAGES              |  |  |
| STRAIN GAGES                |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | #STRAIN GAGES               |  |  |
| RT                          | CABLE FORCE RECORDERS       |  |  |
|                             | DEFORMETERS                 |  |  |
|                             | ELASTOMETERS                |  |  |
|                             | EXTENSOMETERS               |  |  |
|                             | FLIGHT LOAD RECORDERS       |  |  |
|                             | MECHANICAL MEASUREMENT      |  |  |
|                             | PIEZOELECTRIC GAGES         |  |  |
|                             | PRESSURE GAGES              |  |  |
|                             | ROSETTE SHAPES              |  |  |
|                             | SHOCK MEASURING INSTRUMENTS |  |  |
|                             | STRAIN MEASUREMENT          |  |  |
|                             | STRESS MEASUREMENT          |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
|                             | TENSOMETERS                 |  |  |
|                             | TRANSDUCERS                 |  |  |
|                             | WEIGHT INDICATORS           |  |  |
| STRAIN HARDENING            |                             |  |  |
| 1704                        |                             |  |  |
| GS                          | 3203 3404                   |  |  |
|                             | HARDENING (MATERIALS)       |  |  |
|                             | .WORK HARDENING             |  |  |
|                             | .#STRAIN HARDENING          |  |  |
| RT                          | AGING (MATERIALS)           |  |  |
|                             | AGING (METALLURGY)          |  |  |
|                             | PRECIPITATION HARDENING     |  |  |
|                             | RESIDUAL STRESS             |  |  |
|                             | SHOT PEENING                |  |  |
|                             | STRESS RELIEVING            |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
| STRAIN MEASUREMENT          |                             |  |  |
| 1406                        |                             |  |  |
| 3501                        |                             |  |  |
| RT                          | % MEASUREMENT               |  |  |
|                             | SMART STRUCTURES            |  |  |
|                             | STRAIN DISTRIBUTION         |  |  |
|                             | STRAIN GAGES                |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS-STRAIN DIAGRAMS      |  |  |
|                             | STRESS-STRAIN RELATIONSHIPS |  |  |
|                             | STRUCTURAL STRAIN           |  |  |
| STRAIN RATE                 |                             |  |  |
| 3203                        |                             |  |  |
| GS                          | RATES (PER TIME)            |  |  |
| RT                          | #STRAIN ENERGY RELEASE RATE |  |  |
|                             | ELASTIC DEFORMATION         |  |  |
|                             | ELASTIC PROPERTIES          |  |  |
|                             | RELAXATION (MECHANICS)      |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS RELAXATION           |  |  |
| STRAIN FATIGUE              |                             |  |  |
| USE FATIGUE (MATERIALS)     |                             |  |  |
| STRAIN GAGE ACCELEROMETERS  |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 1413 2308 3203 3501         |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .ACCELEROMETERS             |  |  |
| RT                          | #STRAIN GAGE ACCELEROMETERS |  |  |
|                             | PRESSURE GAGES              |  |  |
| STRAIN GAGE BALANCES        |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .INDICATING INSTRUMENTS     |  |  |
|                             | ..WEIGHT INDICATORS         |  |  |
|                             | ..#STRAIN GAGE BALANCES     |  |  |
| RT                          | PRESSURE GAGES              |  |  |
| STRAIN GAGES                |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | #STRAIN GAGES               |  |  |
| RT                          | CABLE FORCE RECORDERS       |  |  |
|                             | DEFORMETERS                 |  |  |
|                             | ELASTOMETERS                |  |  |
|                             | EXTENSOMETERS               |  |  |
|                             | FLIGHT LOAD RECORDERS       |  |  |
|                             | MECHANICAL MEASUREMENT      |  |  |
|                             | PIEZOELECTRIC GAGES         |  |  |
|                             | PRESSURE GAGES              |  |  |
|                             | ROSETTE SHAPES              |  |  |
|                             | SHOCK MEASURING INSTRUMENTS |  |  |
|                             | STRAIN MEASUREMENT          |  |  |
|                             | STRESS MEASUREMENT          |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
|                             | TENSOMETERS                 |  |  |
|                             | TRANSDUCERS                 |  |  |
|                             | WEIGHT INDICATORS           |  |  |
| STRAIN HARDENING            |                             |  |  |
| 1704                        |                             |  |  |
| GS                          | 3203 3404                   |  |  |
|                             | HARDENING (MATERIALS)       |  |  |
|                             | .WORK HARDENING             |  |  |
|                             | .#STRAIN HARDENING          |  |  |
| RT                          | AGING (MATERIALS)           |  |  |
|                             | AGING (METALLURGY)          |  |  |
|                             | PRECIPITATION HARDENING     |  |  |
|                             | RESIDUAL STRESS             |  |  |
|                             | SHOT PEENING                |  |  |
|                             | STRESS RELIEVING            |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
| STRAIN MEASUREMENT          |                             |  |  |
| 1406                        |                             |  |  |
| 3501                        |                             |  |  |
| RT                          | % MEASUREMENT               |  |  |
|                             | SMART STRUCTURES            |  |  |
|                             | STRAIN DISTRIBUTION         |  |  |
|                             | STRAIN GAGES                |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS-STRAIN DIAGRAMS      |  |  |
|                             | STRESS-STRAIN RELATIONSHIPS |  |  |
|                             | STRUCTURAL STRAIN           |  |  |
| STRAIN RATE                 |                             |  |  |
| 3203                        |                             |  |  |
| GS                          | RATES (PER TIME)            |  |  |
| RT                          | #STRAIN ENERGY RELEASE RATE |  |  |
|                             | ELASTIC DEFORMATION         |  |  |
|                             | ELASTIC PROPERTIES          |  |  |
|                             | RELAXATION (MECHANICS)      |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS RELAXATION           |  |  |
| STRAIN FATIGUE              |                             |  |  |
| USE FATIGUE (MATERIALS)     |                             |  |  |
| STRAIN GAGE ACCELEROMETERS  |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 1413 2308 3203 3501         |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .ACCELEROMETERS             |  |  |
| RT                          | #STRAIN GAGE ACCELEROMETERS |  |  |
|                             | PRESSURE GAGES              |  |  |
| STRAIN GAGE BALANCES        |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .INDICATING INSTRUMENTS     |  |  |
|                             | ..WEIGHT INDICATORS         |  |  |
|                             | ..#STRAIN GAGE BALANCES     |  |  |
| RT                          | PRESSURE GAGES              |  |  |
| STRAIN GAGES                |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | #STRAIN GAGES               |  |  |
| RT                          | CABLE FORCE RECORDERS       |  |  |
|                             | DEFORMETERS                 |  |  |
|                             | ELASTOMETERS                |  |  |
|                             | EXTENSOMETERS               |  |  |
|                             | FLIGHT LOAD RECORDERS       |  |  |
|                             | MECHANICAL MEASUREMENT      |  |  |
|                             | PIEZOELECTRIC GAGES         |  |  |
|                             | PRESSURE GAGES              |  |  |
|                             | ROSETTE SHAPES              |  |  |
|                             | SHOCK MEASURING INSTRUMENTS |  |  |
|                             | STRAIN MEASUREMENT          |  |  |
|                             | STRESS MEASUREMENT          |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
|                             | TENSOMETERS                 |  |  |
|                             | TRANSDUCERS                 |  |  |
|                             | WEIGHT INDICATORS           |  |  |
| STRAIN HARDENING            |                             |  |  |
| 1704                        |                             |  |  |
| GS                          | 3203 3404                   |  |  |
|                             | HARDENING (MATERIALS)       |  |  |
|                             | .WORK HARDENING             |  |  |
|                             | .#STRAIN HARDENING          |  |  |
| RT                          | AGING (MATERIALS)           |  |  |
|                             | AGING (METALLURGY)          |  |  |
|                             | PRECIPITATION HARDENING     |  |  |
|                             | RESIDUAL STRESS             |  |  |
|                             | SHOT PEENING                |  |  |
|                             | STRESS RELIEVING            |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
| STRAIN MEASUREMENT          |                             |  |  |
| 1406                        |                             |  |  |
| 3501                        |                             |  |  |
| RT                          | % MEASUREMENT               |  |  |
|                             | SMART STRUCTURES            |  |  |
|                             | STRAIN DISTRIBUTION         |  |  |
|                             | STRAIN GAGES                |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS-STRAIN DIAGRAMS      |  |  |
|                             | STRESS-STRAIN RELATIONSHIPS |  |  |
|                             | STRUCTURAL STRAIN           |  |  |
| STRAIN RATE                 |                             |  |  |
| 3203                        |                             |  |  |
| GS                          | RATES (PER TIME)            |  |  |
| RT                          | #STRAIN ENERGY RELEASE RATE |  |  |
|                             | ELASTIC DEFORMATION         |  |  |
|                             | ELASTIC PROPERTIES          |  |  |
|                             | RELAXATION (MECHANICS)      |  |  |
|                             | STRAIN RATE                 |  |  |
|                             | STRESS RELAXATION           |  |  |
| STRAIN FATIGUE              |                             |  |  |
| USE FATIGUE (MATERIALS)     |                             |  |  |
| STRAIN GAGE ACCELEROMETERS  |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 1413 2308 3203 3501         |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .ACCELEROMETERS             |  |  |
| RT                          | #STRAIN GAGE ACCELEROMETERS |  |  |
|                             | PRESSURE GAGES              |  |  |
| STRAIN GAGE BALANCES        |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | .INDICATING INSTRUMENTS     |  |  |
|                             | ..WEIGHT INDICATORS         |  |  |
|                             | ..#STRAIN GAGE BALANCES     |  |  |
| RT                          | PRESSURE GAGES              |  |  |
| STRAIN GAGES                |                             |  |  |
| 1406                        |                             |  |  |
| GS                          | 3203 3501                   |  |  |
|                             | MEASURING INSTRUMENTS       |  |  |
|                             | #STRAIN GAGES               |  |  |
| RT                          | CABLE FORCE RECORDERS       |  |  |
|                             | DEFORMETERS                 |  |  |
|                             | ELASTOMETERS                |  |  |
|                             | EXTENSOMETERS               |  |  |
|                             | FLIGHT LOAD RECORDERS       |  |  |
|                             | MECHANICAL MEASUREMENT      |  |  |
|                             | PIEZOELECTRIC GAGES         |  |  |
|                             | PRESSURE GAGES              |  |  |
|                             | ROSETTE SHAPES              |  |  |
|                             | SHOCK MEASURING INSTRUMENTS |  |  |
|                             | STRAIN MEASUREMENT          |  |  |
|                             | STRESS MEASUREMENT          |  |  |
|                             | TEMPERATURE INVERSIONS      |  |  |
|                             | TENSOMETERS                 |  |  |
|                             | TRANSDUCERS                 |  |  |
|                             | WEIGHT INDICATORS           |  |  |
| STRAIN HARDENING            |                             |  |  |
| 1704                        |                             |  |  |
| GS                          | 3203 3404                   |  |  |
| </                          |                             |  |  |

|                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NUMERICAL STABILITY<br>PERTURBATION THEORY<br>% PHYSICS<br>RECURSIVE FUNCTIONS<br>STATE VECTORS<br>THEORETICAL PHYSICS<br>TURBULENCE                                                                                                                           | TECHNOLOGY ASSESSMENT<br><br>STRATEGY<br>1902 3401 3402<br>RT DECISION THEORY<br>DEPLOYMENT<br>ELECTRONIC WARFARE<br>GAME THEORY<br>% OPERATIONS<br>OPERATIONS RESEARCH<br>RISK<br>WARFARE                                                                                                                                                           | FORMATIONS<br>GEOCHRONOLOGY<br>GEOLOGY<br>GEOPHYSICS<br>GEOSYNCLINES<br>HYDROGEOLOGY<br>MINES (EXCAVATIONS)<br>PALEONTOLOGY<br>PARTICLE TRACKS<br>PETROLOGY<br>PLATEAUS<br>REGOLITH<br>ROCKS<br>SEDIMENTARY ROCKS<br>STRATIFICATION<br>SYNCLINES<br>WELLS |
| STRANGENESS<br>2401 2403 2405<br>RT HYPERONS<br>MESONS<br>PARITY<br>QUANTUM MECHANICS                                                                                                                                                                          | STRATIFICATION<br>1202 1301 1302 1306<br>GS #STRATIFICATION<br>.ATMOSPHERIC STRATIFICATION<br>.INTERCALATION<br>ANTICLINES<br>BEDROCK<br>CROSSBEDDING (GEOLOGY)<br>FLAT LAYERS<br>FOLDS (GEOLOGY)<br>GEOSYNCLINES<br>% LAYERS<br>STATIC STABILITY<br>STRATA<br>STRATIFIED FLOW<br>STRATIGRAPHY<br>SYNCLINES<br>TEMPERATURE GRADIENTS<br>THERMOCLINES | STRATOCUMULUS CLOUDS<br>1301 2003<br>GS CLOUDS (METEOROLOGY)<br>#STRATOCUMULUS CLOUDS<br>RT CUMULUS CLOUDS<br>STRATUS CLOUDS                                                                                                                              |
| STRAPDOWN INERTIAL GUIDANCE<br>2102 2308<br>GS GUIDANCE (MOTION)<br>.INERTIAL GUIDANCE<br>.#STRAPDOWN INERTIAL GUIDANCE<br>RT INERTIAL NAVIGATION                                                                                                              | STRATIFIED FLOW<br>O101 1202 1203 2502<br>GS FLUID FLOW<br>.LAMINAR FLOW<br>.#STRATIFIED FLOW<br>BAROCLINIC WAVES<br>BAROCLINITY<br>COAXIAL FLOW<br>FLOW GEOMETRY<br>SHEAR FLOW<br>STRATIFICATION                                                                                                                                                    | STRATOFORTRESS AIRCRAFT<br>USE B-52 AIRCRAFT<br><br>STRATOJET AIRCRAFT<br>USE B-47 AIRCRAFT                                                                                                                                                               |
| STRAPS<br>0507 0508 1504 3404<br>RT ANCHORS (FASTENERS)<br>% BANDS<br>CLAMPS<br>FASTENERS<br>HOLDERS                                                                                                                                                           | STRATIFIED FLOW<br>O101 1202 1203 2502<br>GS FLUID FLOW<br>.LAMINAR FLOW<br>.#STRATIFIED FLOW<br>BAROCLINIC WAVES<br>BAROCLINITY<br>COAXIAL FLOW<br>FLOW GEOMETRY<br>SHEAR FLOW<br>STRATIFICATION                                                                                                                                                    | STRATOPAUSE<br>1302 2003 3009<br>SN (ALTITUDE APPROXIMATELY 50 KM)<br>GS EARTH ATMOSPHERE<br>.MIDDLE ATMOSPHERE<br>.STRATOSPHERE<br>.STRATOPAUSE<br>RT MESOPAUSE<br>MESOSPHERE                                                                            |
| STRATA<br>1306<br>UF STRATIFIED LAYERS<br>GS #STRATA<br>.SUBSTRATES<br>ANTICLINES<br>BEDROCK<br>BEDS (GEOLOGY)<br>CROSSBEDDING (GEOLOGY)<br>FLAT LAYERS<br>FOLDS (GEOLOGY)<br>GEOSYNCLINES<br>% LAYERS<br>STRATIFICATION<br>SYNCLINES<br>UNDERGROUND ACOUSTICS | STRATIFIED LAYERS<br>USE STRATA<br><br>STRATIGRAPHY<br>1305 1306<br>RT ANTICLINES<br>BEDROCK<br>BEDS (GEOLOGY)<br>CROSSBEDDING (GEOLOGY)<br>% FORMATION                                                                                                                                                                                              | STRATOSCOPE TELESCOPES<br>1308 1412 3009<br>UF STRATOSCOPE 1 TELESCOPE<br>STRATOSCOPE 2 TELESCOPE<br>GS TELESCOPES<br>.SPECTROSCOPIC TELESCOPES<br>.STRATOSCOPE TELESCOPES<br>RT BALLOONS<br>REFLECTING TELESCOPES<br>REFRACTING TELESCOPES               |
| STRATEGIC MATERIALS<br>0403<br>RT CHROMIUM<br>COBALT<br>MANGANESE<br>% MATERIALS<br>METALS<br>STOCKPILING                                                                                                                                                      | STRATIFIED LAYERS<br>USE STRATA<br><br>STRATIGRAPHY<br>1305 1306<br>RT ANTICLINES<br>BEDROCK<br>BEDS (GEOLOGY)<br>CROSSBEDDING (GEOLOGY)<br>% FORMATION                                                                                                                                                                                              | STRATOSCOPE 1 TELESCOPE<br>USE STRATOSCOPE TELESCOPES                                                                                                                                                                                                     |

# NASA THESAURUS HIERARCHICAL UPDATE

STRATOSCOPE 2 TELESCOPE  
USE STRATOSCOPE TELESCOPES

STRATOSPHERE  
1302 2003 3009  
SN (ALTITUDE RANGE BETWEEN  
APPROXIMATELY 15 AND 50 KM)  
GS EARTH ATMOSPHERE  
.MIDDLE ATMOSPHERE  
.STRATOSPHERE  
...OZONOSPHERE  
...STRATOPAUSE  
RT CHEMOSPHERE  
HOMOSPHERE  
ICE CLOUDS  
ISOTHERMAL LAYERS  
STRATOSPHERIC WARMING

STRATOSPHERE RADIATION  
1302 2003 2903  
GS ATMOSPHERIC RADIATION  
#STRATOSPHERE RADIATION  
RT CORPUSCULAR RADIATION  
ELECTROMAGNETIC RADIATION  
% RADIATION  
SKY RADIATION  
TROPOSPHERIC RADIATION

STRATOSPHERIC AEROSOL & GAS EXPERIMENT  
USE SAGE SATELLITE

STRATOSPHERIC OBSERVATORY FOR IR ASTRONOMY  
USE SOFIA (AIRBORNE OBSERVATORY)

STRATOSPHERIC WARMING  
1302 2001 2003 3009  
GS HEATING  
.ATMOSPHERIC HEATING  
.STRATOSPHERIC WARMING  
RT ANOMALOUS TEMPERATURE ZONES  
ATMOSPHERIC HEAT BUDGET  
ATMOSPHERIC TEMPERATURE  
CLIMATE CHANGE  
GLOBAL WARMING  
ISOTHERMAL LAYERS  
STRATOSPHERE

STRATOTANKER AIRCRAFT  
USE C-135 AIRCRAFT

STRATUS CLOUDS  
1302 2001 2003  
GS CLOUDS (METEOROLOGY)  
#STRATUS CLOUDS  
RT FOG

NIMBOSTRATUS CLOUDS  
STRATOCUMULUS CLOUDS

STREAK CAMERAS  
1407 3501  
GS OPTICAL EQUIPMENT  
.CAMERAS  
.STREAK CAMERAS  
PHOTOGRAPHIC EQUIPMENT  
.CAMERAS  
.STREAK CAMERAS  
RT CAMERA SHUTTERS  
CINEMATOGRAPHY  
LENSES

STREAK PHOTOGRAPHY  
1407 3501  
GS PHOTOGRAPHY  
#STREAK PHOTOGRAPHY  
RT CAMERAS  
ELECTRO-OPTICAL PHOTOGRAPHY  
HIGH SPEED CAMERAS  
IMAGING TECHNIQUES

STREAM FUNCTIONS (FLUIDS)  
1202 1203 2003  
RT INCOMPRESSIBLE FLOW  
POTENTIAL THEORY  
STOKES-BELTRAMI EQUATION  
STREAMS  
TWO DIMENSIONAL FLOW

STREAMLINE FLOW  
USE LAMINAR FLOW

STREAMLINED BODIES  
O101 O102 O104 O201 3404  
GS SYMMETRICAL BODIES  
#STREAMLINED BODIES  
.FAIRINGS

RT AERODYNAMIC CONFIGURATIONS  
AIRFOILS  
% BODIES  
AXISYMMETRIC BODIES  
BODIES OF REVOLUTION  
MISSILE BODIES  
OGIVES  
SLENDER BODIES  
STREAMLINING  
TOWED BODIES

STREAMLINING  
O101 O102 O201 1202 3404  
RT ACOUSTIC STREAMING  
AIR FLOW

AIRCRAFT DESIGN  
AIRCRAFT STRUCTURES  
AIRFOIL PROFILES  
AIRFOILS  
FAIRINGS  
FLUID DYNAMICS  
FRICTION REDUCTION  
HELICOPTER DESIGN  
HYDROFOILS  
% PROFILES  
SKIN FRICTION  
STREAMLINED BODIES

STREAMS  
1306 O201  
GS #STREAMS  
.GAS STREAMS  
RT AIR FLOW  
ALLUVIUM  
AQUIFERS  
DELAWARE RIVER BASIN (US)  
FLUID FLOW  
GAS FLOW  
HYDROLOGY  
HYDROLOGY MODELS  
INTERNATIONAL HYDROLOGICAL DECADE  
LAKE ERIE  
LAKE HURON  
LAKE MICHIGAN  
LAKE ONTARIO  
LAKE SUPERIOR  
LIMNOLOGY  
MEANDERS  
RAPIDS  
RESERVOIRS  
RIVERS  
STREAM FUNCTIONS (FLUIDS)  
SURFACE WATER  
SUSQUEHANNA RIVER BASIN (MD-NY-PA)  
WADIS

STREETS  
1101 1102 1104 3202 3401 3501  
RT HIGHWAYS  
INTERSECTIONS  
PAVEMENTS  
ROADS  
% TUNNELS  
URBAN PLANNING  
URBAN RESEARCH

% STRENGTH  
3408 O408  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS

[illegible]

C-7

1397

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STRESS RUPTURE STRENGTH
USE CREEP RUPTURE STRENGTH

STRESS TENSORS
1202 3203
GS ALGEBRA
. TENSORS
. #STRESS TENSORS
RT CONTINUUM MECHANICS
ELASTIC PROPERTIES
FRACTURE MECHANICS
PLASTIC PROPERTIES
STRUCTURAL DESIGN

STRESS WAVES
0710 1202 3203
GS ELASTIC WAVES
#STRESS WAVES
RT ACOUSTIC EMISSION
SHOCK LAYERS
SHOCK WAVES
STRESSES
TEMPERATURE INVERSIONS
WAVE PROPAGATION
% WAVES

STRESS-STRAIN DIAGRAMS
3203 3404
GS DIAGRAMS
#STRESS-STRAIN DIAGRAMS
RT AXIAL STRAIN
HOOKES LAW
INELASTIC STRESS
MODULUS OF ELASTICITY
POISSON RATIO
PROPORTIONAL LIMIT
SHAPE MEMORY ALLOYS
SHEAR PROPERTIES
STRAIN MEASUREMENT
STRUCTURAL STRAIN
YIELD STRENGTH

STRESS-STRAIN RELATIONSHIPS
3203
RT ELASTIC DEFORMATION
INTERLAMINAR STRESS
PLANE STRAIN
PLASTIC DEFORMATION
% RELATIONSHIPS
RESIDUAL STRESS
STRAIN DISTRIBUTION
STRAIN MEASUREMENT
STRESS CONCENTRATION
STRESS DISTRIBUTION

STRUCTURAL STRAIN
YIELD STRENGTH

STRESS-STRAIN-TIME RELATIONS
1809 3203
RT CREEP DIAGRAMS
NEWTONIAN FLUIDS
THERMOVISCOELASTICITY

STRESSED-SKIN STRUCTURES
0102 0104 0202 3110 3203
RT MONOCOQUE STRUCTURES
SKIN (STRUCTURAL MEMBER)
SPHERICAL SHELLS
% STRUCTURES
THIN WALLED SHELLS

STRESSES
0408 1505 1704 2311 3203
GS #STRESSES
. AXIAL STRESS
. COMBINED STRESS
. CRITICAL LOADING
. INTERLAMINAR STRESS
. PHOTOSTRESSES
. PLANE STRESS
. RESIDUAL STRESS
. REYNOLDS STRESS
. SHEAR STRESS
. . TORSIONAL STRESS
. TENSILE STRESS
. THERMAL STRESSES
. TRIAXIAL STRESSES
. VIBRATIONAL STRESS
BUCKLING
CRACKS
CREEP PROPERTIES
DESTRUCTION
FATIGUE (MATERIALS)
% FLIGHT STRESS
IMPACT
LOADS (FORCES)
MECHANICAL PROPERTIES
MICROYIELD STRENGTH
PRESTRESSING
ROLLING CONTACT LOADS
SHEAR PROPERTIES
STRESS ANALYSIS
STRESS CONCENTRATION
STRESS CYCLES
STRESS RELAXATION
STRESS WAVES
STRUCTURAL STRAIN
TEMPERATURE INVERSIONS
TRANSVERSE LOADS

STRUTCH FORMING
1507 1704 1809 2303
RT BULGING
COLD WORKING
% DRAWING
METAL DRAWING
METAL WORKING
STRETCHING

STRETCHERS
0405
GS MEDICAL EQUIPMENT
#STRETCHERS
RT FIRST AID

STRETCHING
1704 1809 3203
UF DILATATION
RT COLD WORKING
DEEP DRAWING
DILATATIONAL WAVES
DISTORTION
% DRAWING
DUCTILITY
ELASTIC DEFORMATION
ELONGATION
METAL WORKING
PLASTIC DEFORMATION
STRETCH FORMING
TEMPERING
% TENSION
WINDING

STRIATION
0404 0408
RT GROOVING
MUSCULOSKELETAL SYSTEM
RIBLETS
SHATTER CONES

STRING THEORY
2311
SN (DOES NOT INCLUDE CLASSICAL STRING THEORY)
UF SUPERSTRING THEORY
RT BOSONS
COSMOLOGY
FIELD THEORY (PHYSICS)
GAUGE THEORY
GRAND UNIFIED THEORY
GRAVITATION THEORY

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# NASA THESAURUS HIERARCHICAL UPDATE

|                                     |  |  |  |
|-------------------------------------|--|--|--|
| PARTICLE THEORY                     |  |  |  |
| QUANTUM CHROMODYNAMICS              |  |  |  |
| QUANTUM THEORY                      |  |  |  |
| RELATIVITY                          |  |  |  |
| SUPERSYMMETRY                       |  |  |  |
| THEORETICAL PHYSICS                 |  |  |  |
| UNIFIED FIELD THEORY                |  |  |  |
| STRINGERS                           |  |  |  |
| O102 0104 2806 3202 3203            |  |  |  |
| GS STRUCTURAL MEMBERS               |  |  |  |
| #STRINGERS                          |  |  |  |
| RT LONGERONS                        |  |  |  |
| REINFORCEMENT (STRUCTURES)          |  |  |  |
| STRUCTURAL STABILITY                |  |  |  |
| STRINGS                             |  |  |  |
| O202 1103 1504 1807 1811            |  |  |  |
| RT ASSEMBLIES                       |  |  |  |
| CORDAGE                             |  |  |  |
| % STRIP                             |  |  |  |
| 1101 1102 1104 1507 1704            |  |  |  |
| SN (USE OF A MORE SPECIFIC TERM IS  |  |  |  |
| RECOMMENDED--CONSULT THE TERMS      |  |  |  |
| LISTED BELOW)                       |  |  |  |
| RT AIRPORTS                         |  |  |  |
| CIRCUITS                            |  |  |  |
| DISPLAY DEVICES                     |  |  |  |
| METAL STRIPS                        |  |  |  |
| RIBBONS                             |  |  |  |
| RUNWAYS                             |  |  |  |
| STRIP MINING                        |  |  |  |
| 1306 3404                           |  |  |  |
| GS MINING                           |  |  |  |
| #STRIP MINING                       |  |  |  |
| RT CLAYS                            |  |  |  |
| COAL                                |  |  |  |
| EARTH RESOURCES                     |  |  |  |
| EXCAVATION                          |  |  |  |
| EXPLOITATION                        |  |  |  |
| LUNAR MINING                        |  |  |  |
| MINERAL DEPOSITS                    |  |  |  |
| MINES (EXCAVATIONS)                 |  |  |  |
| SOILS                               |  |  |  |
| STRIP TRANSMISSION LINES            |  |  |  |
| O702 0710                           |  |  |  |
| GS TRANSMISSION LINES               |  |  |  |
| #STRIP TRANSMISSION LINES           |  |  |  |
| ..MICROSTRIP TRANSMISSION LINES     |  |  |  |
| RT ANTENNA FEEDS                    |  |  |  |
| TRANSMISSION CIRCUITS               |  |  |  |
| % STRIPPING                         |  |  |  |
| O602 1504                           |  |  |  |
| SN (USE OF A MORE SPECIFIC TERM IS  |  |  |  |
| RECOMMENDED--CONSULT THE TERMS      |  |  |  |
| LISTED BELOW)                       |  |  |  |
| RT ANODIC STRIPPING                 |  |  |  |
| ION STRIPPING                       |  |  |  |
| PEELING                             |  |  |  |
| STRIPPING (DISTILLATION)            |  |  |  |
| STRIPPING (DISTILLATION)            |  |  |  |
| O602                                |  |  |  |
| GS DISTILLATION                     |  |  |  |
| #STRIPPING (DISTILLATION)           |  |  |  |
| RT % SEPARATION                     |  |  |  |
| % STRIPPING                         |  |  |  |
| VAPORIZING                          |  |  |  |
| STROBOSCOPES                        |  |  |  |
| 1406 1504 2310                      |  |  |  |
| GS OPTICAL EQUIPMENT                |  |  |  |
| #STROBOSCOPES                       |  |  |  |
| RT BALLISTIC CAMERAS                |  |  |  |
| HIGH SPEED CAMERAS                  |  |  |  |
| OPTICAL MEASUREMENT                 |  |  |  |
| SYNCHRONISM                         |  |  |  |
| TIME MEASUREMENT                    |  |  |  |
| VELOCITY MEASUREMENT                |  |  |  |
| STROKE VOLUME                       |  |  |  |
| O405 0408                           |  |  |  |
| GS OUTPUT                           |  |  |  |
| .CARDIAC OUTPUT                     |  |  |  |
| .#STROKE VOLUME                     |  |  |  |
| RT BLOOD VOLUME                     |  |  |  |
| CARDIOVASCULAR SYSTEM               |  |  |  |
| HEART FUNCTION                      |  |  |  |
| HEART RATE                          |  |  |  |
| PHYSIOLOGICAL TESTS                 |  |  |  |
| % STROKES                           |  |  |  |
| O404 0408 0602 1504 3406            |  |  |  |
| SN (USE OF A MORE SPECIFIC TERM IS  |  |  |  |
| RECOMMENDED--CONSULT THE TERMS      |  |  |  |
| LISTED BELOW)                       |  |  |  |
| RT CEREBRAL VASCULAR ACCIDENTS      |  |  |  |
| THERMODYNAMIC CYCLES                |  |  |  |
| STROKING TESTS                      |  |  |  |
| 1106 1108 1504 1505 3501            |  |  |  |
| GS VIBRATION TESTS                  |  |  |  |
| .DAMPING TESTS                      |  |  |  |
| .#STROKING TESTS                    |  |  |  |
| RT DYNAMIC RESPONSE                 |  |  |  |
| % FREQUENCY RESPONSE                |  |  |  |
| STRONG INTERACTIONS (FIELD THEORY)  |  |  |  |
| 1902 3009                           |  |  |  |
| GS FIELD THEORY (PHYSICS)           |  |  |  |
| #STRONG INTERACTIONS (FIELD THEORY) |  |  |  |
| PARTICLE INTERACTIONS               |  |  |  |
| .ELEMENTARY PARTICLE INTERACTIONS   |  |  |  |
| ..HIGH ENERGY INTERACTIONS          |  |  |  |
| ..#STRONG INTERACTIONS (FIELD       |  |  |  |
| THEORY)                             |  |  |  |
| RT GRAND UNIFIED THEORY             |  |  |  |
| % INTERACTIONS                      |  |  |  |
| NUCLEAR INTERACTIONS                |  |  |  |
| NUCLEAR REACTIONS                   |  |  |  |
| THEORIES                            |  |  |  |
| WEAK INTERACTIONS (FIELD THEORY)    |  |  |  |
| STRONGLY COUPLED PLASMAS            |  |  |  |
| 2501                                |  |  |  |
| GS PARTICLES                        |  |  |  |
| .CHARGED PARTICLES                  |  |  |  |
| ..ENERGETIC PARTICLES               |  |  |  |
| ...PLASMAS (PHYSICS)                |  |  |  |
| ....COLLISIONAL PLASMAS             |  |  |  |
| ....#STRONGLY COUPLED PLASMAS       |  |  |  |
| ....DENSE PLASMAS                   |  |  |  |
| ....#STRONGLY COUPLED PLASMAS       |  |  |  |
| CONTROLLED FUSION                   |  |  |  |
| RT COSMIC PLASMA                    |  |  |  |
| COUPLED MODES                       |  |  |  |
| HIGH TEMPERATURE PLASMAS            |  |  |  |
| INERTIAL CONFINEMENT FUSION         |  |  |  |
| MAGNETOHYDRODYNAMIC STABILITY       |  |  |  |
| PLASMA COMPRESSION                  |  |  |  |
| PLASMA CONDUCTIVITY                 |  |  |  |
| PLASMA DENSITY                      |  |  |  |
| PLASMA EQUILIBRIUM                  |  |  |  |
| PLASMA FOCUS                        |  |  |  |
| STRONTIUM                           |  |  |  |
| 1703                                |  |  |  |
| GS CHEMICAL ELEMENTS                |  |  |  |
| #STRONTIUM                          |  |  |  |
| ..STRONTIUM ISOTOPES                |  |  |  |
| ...STRONTIUM 85                     |  |  |  |
| ...STRONTIUM 87                     |  |  |  |
| ...STRONTIUM 89                     |  |  |  |
| ...STRONTIUM 90                     |  |  |  |
| METALS                              |  |  |  |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

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| <p>METALS</p> <p>.STRONTIUM</p> <p>..STRONTIUM ISOTOPES</p> <p>..#STRONTIUM 89</p> <p>STRONTIUM 90</p> <p>1703 2406</p> <p>GS CHEMICAL ELEMENTS</p> <p>.NUCLIDES</p> <p>..ISOTOPES</p> <p>...RADIOACTIVE ISOTOPES</p> <p>...#STRONTIUM 90</p> <p>...STRONTIUM ISOTOPES</p> <p>...#STRONTIUM 90</p> <p>.STRONTIUM</p> <p>..STRONTIUM ISOTOPES</p> <p>..#STRONTIUM 90</p> <p>METALS</p> <p>.STRONTIUM</p> <p>..STRONTIUM ISOTOPES</p> <p>..#STRONTIUM 90</p> <p>STROUHAL NUMBER</p> <p>0101 1202</p> <p>GS RATIOS</p> <p>.DIMENSIONLESS NUMBERS</p> <p>.#STROUHAL NUMBER</p> <p>RT BACKWASH</p> <p>BUFFETING</p> <p>FLOW CHARACTERISTICS</p> <p>FLOW DISTRIBUTION</p> <p>FLOW STABILITY</p> <p>FROUDE NUMBER</p> <p>OSCILLATING FLOW</p> <p>SLIPSTREAMS</p> <p>TURBULENCE</p> <p>UNSTEADY FLOW</p> <p>VORTICES</p> <p>WAKES</p> <p>STRUCTURAL ANALYSIS</p> <p>3203</p> <p>UF MEMBRANE ANALOGY</p> <p>MEMBRANE THEORY</p> <p>GS #STRUCTURAL ANALYSIS</p> <p>.DYNAMIC STRUCTURAL ANALYSIS</p> <p>.ENERGY METHODS</p> <p>..BERNSTEIN ENERGY PRINCIPLE</p> <p>..STRAIN ENERGY METHODS</p> <p>.EQUILIBRIUM METHODS</p> <p>.FLUTTER ANALYSIS</p> <p>.MATRIX METHODS</p> <p>RT % ANALYZING</p> <p>CASTIGLIANO VARIATIONAL THEOREM</p> <p>CONSTRUCTION</p> | <p>CONTINUUM MODELING</p> <p>CREEP ANALYSIS</p> <p>HOLE GEOMETRY (MECHANICS)</p> <p>INFLUENCE COEFFICIENT</p> <p>J INTEGRAL</p> <p>LOADING MOMENTS</p> <p>MEGAMECHANICS</p> <p>MICHELL THEOREM</p> <p>MODULAR RATIOS</p> <p>MOMENT DISTRIBUTION</p> <p>NASTRAN</p> <p>ORBITAL SPACE TESTS</p> <p>PATCH TESTS</p> <p>PLATE THEORY</p> <p>SHAPE FUNCTIONS</p> <p>SOLID MECHANICS</p> <p>STIFFNESS MATRIX</p> <p>STRESS ANALYSIS</p> <p>STRUCTURAL BASINS</p> <p>1305 1306</p> <p>UF BASINS</p> <p>CLOSED BASINS</p> <p>DEPRESSIONS (TOPOGRAPHY)</p> <p>SINKS (GEOLOGY)</p> <p>LANDFORMS</p> <p>GS #STRUCTURAL BASINS</p> <p>..CIRQUES (LANDFORMS)</p> <p>..GREAT BASIN (US)</p> <p>..KALAHARI BASIN (AFRICA)</p> <p>..KARST</p> <p>...SINKHOLES</p> <p>...KETTLES (GEOLOGY)</p> <p>...LAKE CHAMPLAIN BASIN (NY-VT)</p> <p>...RIVER BASINS</p> <p>...ATCHAFALAYA RIVER BASIN (LA)</p> <p>...CHENA RIVER BASIN (AK)</p> <p>...COLUMBIA RIVER BASIN (ID-OR-WA)</p> <p>...DELAWARE RIVER BASIN (US)</p> <p>...FEATHER RIVER BASIN (CA)</p> <p>...MISSOURI RIVER BASIN (US)</p> <p>...SUSQUEHANNA RIVER BASIN (MD-NY-PA)</p> <p>...WABASH RIVER BASIN (IL-IN-OH)</p> <p>...WADIS</p> <p>...WATERSHEDS</p> <p>..WILLISTON BASIN (NORTH AMERICA)</p> <p>RT GEOLOGY</p> <p>SEAMOUNTS</p> <p>VALLEYS</p> <p>STRUCTURAL BEAMS</p> <p>USE BEAMS (SUPPORTS)</p> <p>STRUCTURAL DESIGN</p> | <p>3203 4001</p> <p>GS #STRUCTURAL DESIGN</p> <p>.PRESSURE VESSEL DESIGN</p> <p>RT AEROELASTIC RESEARCH WINGS</p> <p>AIRCRAFT DESIGN</p> <p>AIRFRAME MATERIALS</p> <p>ARCHITECTURE</p> <p>BREAKWATERS</p> <p>COMPUTER AIDED DESIGN</p> <p>CONSTRUCTION</p> <p>% DESIGN</p> <p>HELICOPTER DESIGN</p> <p>LOFTING</p> <p>MISSILE DESIGN</p> <p>PLANT DESIGN</p> <p>PRODUCT DEVELOPMENT</p> <p>SATELLITE DESIGN</p> <p>SHIP HULLS</p> <p>SHOCK SPECTRA</p> <p>SPACE STATION STRUCTURES</p> <p>SPACECRAFT DESIGN</p> <p>SPACECRAFT STRUCTURES</p> <p>STRESS ANALYSIS</p> <p>STRESS TENSORS</p> <p>SUBSTRUCTURES</p> <p>UNDERWATER STRUCTURES</p> <p>WEIGHT REDUCTION</p> <p>STRUCTURAL DESIGN CRITERIA</p> <p>3203</p> <p>GS CRITERIA</p> <p>#STRUCTURAL DESIGN CRITERIA</p> <p>RT AERODYNAMIC LOADS</p> <p>AXIAL COMPRESSION LOADS</p> <p>AXIAL LOADS</p> <p>BENDING MOMENTS</p> <p>COMPRESSION LOADS</p> <p>CYCLIC LOADS</p> <p>% DESIGN</p> <p>DYNAMIC LOADS</p> <p>GEOTECHNICAL ENGINEERING</p> <p>GUST LOADS</p> <p>IMPACT LOADS</p> <p>LANDING LOADS</p> <p>LOADS (FORCES)</p> <p>MASS DISTRIBUTION</p> <p>MOMENT DISTRIBUTION</p> <p>PRESSURE DISTRIBUTION</p> <p>RANDOM LOADS</p> <p>ROLLING CONTACT LOADS</p> <p>SHOCK LOADS</p> <p>STATIC LOADS</p> <p>THRUST LOADS</p> <p>TRANSIENT LOADS</p> <p>VIBRATORY LOADS</p> |
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|                                     |  |                                 |  |  |  |
|-------------------------------------|--|---------------------------------|--|--|--|
| STRUCTURAL DYNAMICS                 |  | STRUCTURAL PROPERTIES (GEOLOGY) |  |  |  |
| USE DYNAMIC STRUCTURAL ANALYSIS     |  | 1306                            |  |  |  |
| STRUCTURAL ENGINEERING              |  | UF                              |  |  |  |
| 3203 3404                           |  | GS                              |  |  |  |
| RT                                  |  | RT                              |  |  |  |
| AERONAUTICAL ENGINEERING            |  |                                 |  |  |  |
| AEROSPACE ENGINEERING               |  |                                 |  |  |  |
| CONSTRUCTION                        |  |                                 |  |  |  |
| ENGINEERING                         |  |                                 |  |  |  |
| %                                   |  |                                 |  |  |  |
| GEOTECHNICAL ENGINEERING            |  |                                 |  |  |  |
| MECHANICS                           |  |                                 |  |  |  |
| MODULAR RATIOS                      |  |                                 |  |  |  |
| SMART STRUCTURES                    |  |                                 |  |  |  |
| STRESS ANALYSIS                     |  |                                 |  |  |  |
| STRUCTURAL FAILURE                  |  |                                 |  |  |  |
| 1702 3201 3203                      |  |                                 |  |  |  |
| GS                                  |  |                                 |  |  |  |
| FAILURE                             |  |                                 |  |  |  |
| #STRUCTURAL FAILURE                 |  |                                 |  |  |  |
| RT                                  |  |                                 |  |  |  |
| BENDING                             |  |                                 |  |  |  |
| BUCKLING                            |  |                                 |  |  |  |
| COLLAPSE                            |  |                                 |  |  |  |
| CRACKING (FRACTURING)               |  |                                 |  |  |  |
| CREEP PROPERTIES                    |  |                                 |  |  |  |
| DEFORMATION                         |  |                                 |  |  |  |
| FATIGUE (MATERIALS)                 |  |                                 |  |  |  |
| FRACTURING                          |  |                                 |  |  |  |
| LOAD CARRYING CAPACITY              |  |                                 |  |  |  |
| MECHANICAL PROPERTIES               |  |                                 |  |  |  |
| SYSTEM FAILURES                     |  |                                 |  |  |  |
| STRUCTURAL FATIGUE                  |  |                                 |  |  |  |
| USE FATIGUE (MATERIALS)             |  |                                 |  |  |  |
| STRUCTURAL FOUNDATIONS              |  |                                 |  |  |  |
| USE FOUNDATIONS                     |  |                                 |  |  |  |
| STRUCTURAL INFLUENCE COEFFICIENTS   |  |                                 |  |  |  |
| 1809 3203                           |  |                                 |  |  |  |
| UF                                  |  |                                 |  |  |  |
| SIC (COEFFICIENT)                   |  |                                 |  |  |  |
| GS                                  |  |                                 |  |  |  |
| COEFFICIENTS                        |  |                                 |  |  |  |
| .INFLUENCE COEFFICIENT              |  |                                 |  |  |  |
| .#STRUCTURAL INFLUENCE COEFFICIENTS |  |                                 |  |  |  |
| STRUCTURAL MATERIALS                |  |                                 |  |  |  |
| USE CONSTRUCTION MATERIALS          |  |                                 |  |  |  |
| STRUCTURAL MEMBERS                  |  |                                 |  |  |  |
| 3202 3203                           |  |                                 |  |  |  |
| GS                                  |  |                                 |  |  |  |
| #STRUCTURAL MEMBERS                 |  |                                 |  |  |  |
| .BEAMS (SUPPORTS)                   |  |                                 |  |  |  |
| .BOX BEAMS                          |  |                                 |  |  |  |
| .CANTILEVER BEAMS                   |  |                                 |  |  |  |
| .CURVED BEAMS                       |  |                                 |  |  |  |
| ..I BEAMS                           |  |                                 |  |  |  |
| ..RECTANGULAR BEAMS                 |  |                                 |  |  |  |
| ..TIMOSHENKO BEAMS                  |  |                                 |  |  |  |
| .COLUMNS (SUPPORTS)                 |  |                                 |  |  |  |
| .TAPERED COLUMNS                    |  |                                 |  |  |  |
| .FLAT PLATES                        |  |                                 |  |  |  |
| .GIRDERS                            |  |                                 |  |  |  |
| .LONGERONS                          |  |                                 |  |  |  |
| .MEMBRANE STRUCTURES                |  |                                 |  |  |  |
| .SKIN (STRUCTURAL MEMBER)           |  |                                 |  |  |  |
| .PLATES (STRUCTURAL MEMBERS)        |  |                                 |  |  |  |
| ..ANISOTROPIC PLATES                |  |                                 |  |  |  |
| ..ANNULAR PLATES                    |  |                                 |  |  |  |
| ..CANTILEVER PLATES                 |  |                                 |  |  |  |
| ..CIRCULAR PLATES                   |  |                                 |  |  |  |
| ..CORRUGATED PLATES                 |  |                                 |  |  |  |
| ..ELASTIC PLATES                    |  |                                 |  |  |  |
| ..END PLATES                        |  |                                 |  |  |  |
| ..GIRDER WEBS                       |  |                                 |  |  |  |
| ..METAL PLATES                      |  |                                 |  |  |  |
| ..BOILER PLATE                      |  |                                 |  |  |  |
| ..ORTHOTROPIC PLATES                |  |                                 |  |  |  |
| ..PERFORATED PLATES                 |  |                                 |  |  |  |
| ..PLASTIC PLATES                    |  |                                 |  |  |  |
| ..POROUS PLATES                     |  |                                 |  |  |  |
| ..RECTANGULAR PLATES                |  |                                 |  |  |  |
| ..REINFORCED PLATES                 |  |                                 |  |  |  |
| ..SADDLES (SUPPORTS)                |  |                                 |  |  |  |
| ..STRAKES                           |  |                                 |  |  |  |
| ..STRINGERS                         |  |                                 |  |  |  |
| ..STRUTS                            |  |                                 |  |  |  |
| ..TRUSSES                           |  |                                 |  |  |  |
| .WING PANELS                        |  |                                 |  |  |  |
| AIRCRAFT CONSTRUCTION MATERIALS     |  |                                 |  |  |  |
| RT                                  |  |                                 |  |  |  |
| AIRFRAME MATERIALS                  |  |                                 |  |  |  |
| BARS                                |  |                                 |  |  |  |
| % CHANNELS                          |  |                                 |  |  |  |
| % COMPONENTS                        |  |                                 |  |  |  |
| CONCRETES                           |  |                                 |  |  |  |
| CONSTRUCTION                        |  |                                 |  |  |  |
| % CONSTRUCTION MATERIALS            |  |                                 |  |  |  |
| FASTENERS                           |  |                                 |  |  |  |
| FOUNDATIONS                         |  |                                 |  |  |  |
| GUY WIRES                           |  |                                 |  |  |  |
| JOINTS (JUNCTIONS)                  |  |                                 |  |  |  |
| MASONRY                             |  |                                 |  |  |  |
| PYLON MOUNTING                      |  |                                 |  |  |  |
| PYLONS                              |  |                                 |  |  |  |
| RECTANGULAR PANELS                  |  |                                 |  |  |  |
| REINFORCEMENT (STRUCTURES)          |  |                                 |  |  |  |
| RODS                                |  |                                 |  |  |  |
| SLABS                               |  |                                 |  |  |  |
| SMART STRUCTURES                    |  |                                 |  |  |  |
| STIFFNESS MATRIX                    |  |                                 |  |  |  |
| % STRUCTURES                        |  |                                 |  |  |  |
| STRUCTURAL RIGIDITY                 |  |                                 |  |  |  |
| USE STRUCTURAL STABILITY            |  |                                 |  |  |  |
| STRUCTURAL STABILITY                |  |                                 |  |  |  |
| 0101 3203                           |  |                                 |  |  |  |
| UF                                  |  |                                 |  |  |  |
| STRUCTURAL RIGIDITY                 |  |                                 |  |  |  |
| GS                                  |  |                                 |  |  |  |
| MECHANICAL PROPERTIES               |  |                                 |  |  |  |
| .DIMENSIONAL STABILITY              |  |                                 |  |  |  |
| .#STRUCTURAL STABILITY              |  |                                 |  |  |  |
| ...SHELL STABILITY                  |  |                                 |  |  |  |
| STABILITY                           |  |                                 |  |  |  |
| .STATIC STABILITY                   |  |                                 |  |  |  |
| .DIMENSIONAL STABILITY              |  |                                 |  |  |  |
| ..#STRUCTURAL STABILITY             |  |                                 |  |  |  |
| ....SHELL STABILITY                 |  |                                 |  |  |  |
| AIRCRAFT STABILITY                  |  |                                 |  |  |  |
| COMBUSTION VIBRATION                |  |                                 |  |  |  |
| HYBRID STRUCTURES                   |  |                                 |  |  |  |
| LOAD CARRYING CAPACITY              |  |                                 |  |  |  |
| STRUCTURAL RELIABILITY              |  |                                 |  |  |  |
| 0101 1505 3203                      |  |                                 |  |  |  |
| GS                                  |  |                                 |  |  |  |
| RELIABILITY                         |  |                                 |  |  |  |
| #STRUCTURAL RELIABILITY             |  |                                 |  |  |  |
| RT                                  |  |                                 |  |  |  |
| AIRCRAFT RELIABILITY                |  |                                 |  |  |  |
| COMPONENT RELIABILITY               |  |                                 |  |  |  |
| CUMULATIVE DAMAGE                   |  |                                 |  |  |  |
| QUALITY CONTROL                     |  |                                 |  |  |  |
| STRUCTURAL RIGIDITY                 |  |                                 |  |  |  |
| USE STRUCTURAL STABILITY            |  |                                 |  |  |  |
| STRUCTURAL STABILITY                |  |                                 |  |  |  |
| 0101 3203                           |  |                                 |  |  |  |
| UF                                  |  |                                 |  |  |  |
| STRUCTURAL RIGIDITY                 |  |                                 |  |  |  |
| GS                                  |  |                                 |  |  |  |
| MECHANICAL PROPERTIES               |  |                                 |  |  |  |
| .DIMENSIONAL STABILITY              |  |                                 |  |  |  |
| .#STRUCTURAL STABILITY              |  |                                 |  |  |  |
| ...SHELL STABILITY                  |  |                                 |  |  |  |
| STABILITY                           |  |                                 |  |  |  |
| .STATIC STABILITY                   |  |                                 |  |  |  |
| .DIMENSIONAL STABILITY              |  |                                 |  |  |  |
| ..#STRUCTURAL STABILITY             |  |                                 |  |  |  |
| ....SHELL STABILITY                 |  |                                 |  |  |  |
| AIRCRAFT STABILITY                  |  |                                 |  |  |  |
| COMBUSTION VIBRATION                |  |                                 |  |  |  |
| HYBRID STRUCTURES                   |  |                                 |  |  |  |
| LOAD CARRYING CAPACITY              |  |                                 |  |  |  |

## NASA THESAURUS HIERARCHICAL UPDATE

|                             |                               |                                 |                              |
|-----------------------------|-------------------------------|---------------------------------|------------------------------|
| LONGERONS                   |                               | ...SUBSONIC FLUTTER             | FOLDING STRUCTURES           |
| PLASTIC PROPERTIES          |                               | ...SUPERSONIC FLUTTER           | FOUNDATIONS                  |
| REINFORCEMENT (STRUCTURES)  |                               | ...TRANSONIC FLUTTER            | FRAMES                       |
| RESONANCE TESTING           |                               | ..TORSIONAL VIBRATION           | GALACTIC STRUCTURE           |
| % RIGIDITY                  | RT                            | AIRFOIL OSCILLATIONS            | HONEYCOMB STRUCTURES         |
| STIFFNESS                   |                               | EARTHQUAKE RESISTANT STRUCTURES | HYBRID STRUCTURES            |
| STRINGERS                   |                               | FLEXIBLE SPACECRAFT             | HYPERFINE STRUCTURE          |
| WAVE RESISTANCE             |                               | FLUTTER ANALYSIS                | INFATIGABLE STRUCTURES       |
|                             |                               | GYRODAMPERS                     | INTRAMOLECULAR STRUCTURES    |
| STRUCTURAL STRAIN           |                               | RANDOM VIBRATION                | ISOTENSOID STRUCTURES        |
| O101 3203 3204              |                               | RESONANT VIBRATION              | LARGE SPACE STRUCTURES       |
| GS FATIGUE (MATERIALS)      |                               | ROTOR DYNAMICS                  | MEMBRANE STRUCTURES          |
| #STRUCTURAL STRAIN          |                               | SHAKING                         | MICROSTRUCTURE               |
| AXIAL STRAIN                |                               | SHOCK SPECTRA                   | MISSILE STRUCTURES           |
| BENDING                     |                               | STROKING TESTS                  | MOLECULAR STRUCTURE          |
| BUCKLING                    |                               | VIBRATION TESTS                 | MONOCOQUE STRUCTURES         |
| CRACKING (FRACTURING)       |                               |                                 | PLANAR STRUCTURES            |
| DEFLECTION                  |                               |                                 | REDUNDANT COMPONENTS         |
| DEFORMATION                 |                               |                                 | RIGID STRUCTURES             |
| ELASTIC DEFORMATION         |                               | STRUCTURAL WEIGHT               | RING STRUCTURES              |
| FAILURE                     | 1406 3203 3501                | WEIGHT (MASS)                   | SANDWICH STRUCTURES          |
| LOAD CARRYING CAPACITY      | GS                            | #STRUCTURAL WEIGHT              | SMART STRUCTURES             |
| MOMENTS OF INERTIA          | RT                            | MASS RATIOS                     | SPACE ERECTABLE STRUCTURES   |
| PLASTIC DEFORMATION         |                               | NEW MOONS PROJECT               | SPACE STATION STRUCTURES     |
| PRESSRESSING                |                               | WEIGHT ANALYSIS                 | SPACECRAFT STRUCTURES        |
| REINFORCEMENT (STRUCTURES)  |                               | WEIGHT REDUCTION                | STEEL STRUCTURES             |
| RUPTURING                   |                               |                                 | STELLAR STRUCTURE            |
| SHEAR STRAIN                |                               | STRUCTURED PROGRAMMING          | STRESSED-SKIN STRUCTURES     |
| SHEARING                    | O802                          |                                 | STRUCTURAL MEMBERS           |
| STRAIN MEASUREMENT          | GS                            | COMPUTER PROGRAMMING            | SUBSTRUCTURES                |
| STRESS CONCENTRATION        |                               | #STRUCTURED PROGRAMMING         | TANKS (CONTAINERS)           |
| STRESS-STRAIN DIAGRAMS      | RT                            | COMPUTER AIDED DESIGN           | TOWERS                       |
| STRESS-STRAIN RELATIONSHIPS |                               | COMPUTER PROGRAMS               | TRUSSES                      |
| STRESSES                    |                               | DATA STRUCTURES                 | UNIMOLECULAR STRUCTURES      |
| SYSTEM FAILURES             | %                             | PROGRAMMING                     | VARIABLE GEOMETRY STRUCTURES |
| TEMPERATURE INVERSIONS      |                               | PROGRAMMING LANGUAGES           | WELDED STRUCTURES            |
| TWISTING                    |                               | SOFTWARE ENGINEERING            | WOODEN STRUCTURES            |
| VOLUMETRIC STRAIN           |                               |                                 |                              |
| WARPAGE                     | % STRUCTURES                  |                                 |                              |
|                             | 2311 2401 2404 2601 3202 3203 |                                 |                              |
| STRUCTURAL VIBRATION        | SN                            | (USE OF A MORE SPECIFIC TERM IS | STRUTS                       |
| 2301 2312 3203              |                               | RECOMMENDED--CONSULT THE TERMS  | 1204                         |
| GS VIBRATION                |                               | LISTED BELOW)                   | GS                           |
| #STRUCTURAL VIBRATION       | RT                            | AIRCRAFT STRUCTURES             | #STRUTS                      |
| ..BENDING VIBRATION         |                               | ARCHITECTURE                    | CHASSIS                      |
| ..BREATHING VIBRATION       |                               | ATOMIC STRUCTURE                | COLUMNS (SUPPORTS)           |
| ..FLUTTER                   |                               | BREAKWATERS                     | FRAMES                       |
| ...PANEL FLUTTER            |                               | BRIDGES (STRUCTURES)            | PYLONS                       |
| ...SUBSONIC FLUTTER         |                               | COMPOSITE STRUCTURES            | SUPPORTS                     |
| ...SUPERSONIC FLUTTER       |                               | CONCRETE STRUCTURES             | TRUSSES                      |
| ...TRANSONIC FLUTTER        |                               | CONFIGURATION INTERACTION       |                              |
| ..LINEAR VIBRATION          |                               | CRYSTAL STRUCTURE               |                              |
| ..MISSILE VIBRATION         |                               | EARTH PLANETARY STRUCTURE       | STRYCHNINE                   |
| ..SELF INDUCED VIBRATION    |                               | EARTHQUAKE RESISTANT STRUCTURES | O405 O409 O412               |
| ...PANEL FLUTTER            |                               | EXPANDABLE STRUCTURES           | GS BASES (CHEMICAL)          |
|                             |                               | FINE STRUCTURE                  | .ALKALOIDS                   |
|                             |                               |                                 | ..#STRYCHNINE                |
|                             |                               |                                 | NITROGEN COMPOUNDS           |

.ALKALOIDS  
 .#STRYCHNINE  
 ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ...ALKALOIDS  
 ...#STRYCHNINE  
 POISONS  
 #STRYCHNINE  
 STIMULANTS  
 RT  
 STS  
 USE SPACE TRANSPORTATION SYSTEM  
 STS-1  
 USE SPACE TRANSPORTATION SYSTEM 1  
 FLIGHT  
 STS-2  
 USE SPACE TRANSPORTATION SYSTEM 2  
 FLIGHT  
 STS-3  
 USE SPACE TRANSPORTATION SYSTEM 3  
 FLIGHT  
 STS-4  
 USE SPACE TRANSPORTATION SYSTEM 4  
 FLIGHT  
 STUDENTS  
 O410 O502 3406  
 UF TRAINEES  
 RT EDUCATION  
 INSTRUCTORS  
 LEARNING  
 TRAINING EVALUATION  
 UNIVERSITIES  
 STUDIES  
 USE INVESTIGATION  
 STUDS (STRUCTURAL MEMBERS)  
 1504  
 RT ANCHORS (FASTENERS)  
 BOLTS  
 COLUMNS (SUPPORTS)  
 FASTENERS  
 HOLDERS  
 LUGS  
 PINS  
 SCREWS  
 WALLS  
 STUNT FLYING  
 USE AEROBATICS  
 STURM-LIOUVILLE OPERATOR  
 USE STURM-LIOUVILLE THEORY  
 STURM-LIOUVILLE THEORY  
 1902 2311  
 UF STURM-LIOUVILLE OPERATOR  
 GS ANALYSIS (MATHEMATICS)  
 .REAL VARIABLES  
 .#STURM-LIOUVILLE THEORY  
 DIFFERENTIAL EQUATIONS  
 LAMB WAVES  
 LAME WAVE EQUATIONS  
 % THEORIES  
 STYLUSES  
 USE PENS  
 STYPHNATES  
 3302  
 GS EXPLOSIVES  
 #STYPHNATES  
 RT % CHEMICAL COMPOUNDS  
 % INITIATORS  
 INITIATORS (EXPLOSIVES)  
 STYRENES  
 1808 1810  
 GS #STYRENES  
 .POLYSTYRENE  
 ..STYROFOAM (TRADEMARK)  
 RT BUNA (TRADEMARK)  
 STYROFOAM (TRADEMARK)  
 1808 1809 1810  
 GS PLASTICS  
 .POLYSTYRENE  
 .#STYROFOAM (TRADEMARK)  
 STYRENES  
 .POLYSTYRENE  
 .#STYROFOAM (TRADEMARK)  
 RT FOAMS  
 % POLYMERS  
 SUBARCTIC REGIONS  
 1305 1308 2003  
 GS REGIONS  
 #SUBARCTIC REGIONS  
 RT ARCTIC REGIONS  
 SUBASSEMBLIES  
 1504 2806  
 UF SUBCIRCUITS  
 GS ASSEMBLIES  
 #SUBASSEMBLIES  
 ACCESSORIES  
 % COMPONENTS  
 SUBAUDIBLE FREQUENCIES  
 2301  
 GS FREQUENCIES  
 #SUBAUDIBLE FREQUENCIES  
 RANGE (EXTREMES)  
 .FREQUENCY RANGES  
 .#SUBAUDIBLE FREQUENCIES  
 ACOUSTIC FREQUENCIES  
 FREQUENCY DISTRIBUTION  
 HARMONICS  
 ZERO SOUND  
 SUBCARRIER WAVES  
 USE CARRIER WAVES  
 SUBCIRCUITS  
 USE CIRCUITS  
 SUBASSEMBLIES  
 SUBCONTRACTS  
 1106 3401 3402 3406 3409 4001  
 GS CONTRACTS  
 #SUBCONTRACTS  
 RT AGREEMENTS  
 CONTRACT MANAGEMENT  
 CONTRACT NEGOTIATION  
 CONTRACTORS  
 ESTIMATES  
 GRANTS  
 OPTIONS  
 PROCUREMENT  
 SUBCRITICAL FLOW  
 1202 1203  
 GS FLUID FLOW  
 #SUBCRITICAL FLOW  
 CRITICAL FLOW  
 FLOW CHARACTERISTICS  
 GAS FLOW  
 LIQUID FLOW  
 MULTIPHASE FLOW  
 ORIFICE FLOW  
 PIPE FLOW  
 PRESSURE GRADIENTS  
 SINGLE-PHASE FLOW  
 STEADY FLOW  
 STEAM FLOW  
 SUPERCRITICAL FLOW  
 TURBULENT FLOW  
 UNIFORM FLOW  
 UNSTEADY FLOW

# NASA THESAURUS HIERARCHICAL UPDATE

|                   |           |                                  |  |
|-------------------|-----------|----------------------------------|--|
| SUBCRITICAL MASS  | USE       | MICROGRAVITY                     |  |
| 2311 2405         | SUBGROUPS |                                  |  |
| GS MASS           | 1902      |                                  |  |
| #SUBCRITICAL MASS | UF        | SUBLATTICES                      |  |
| RT CRITICAL MASS  | GS        | ALGEBRA                          |  |
| NUCLEAR FISSION   |           | . GROUP THEORY                   |  |
| NUCLEAR REACTIONS |           | . . HOMOMORPHISMS                |  |
|                   |           | . . SUBGROUPS                    |  |
| SUBDIVISIONS      | RT        | MATRICES (MATHEMATICS)           |  |
| 3406              |           | NUMBER THEORY                    |  |
| RT % DIVISION     |           | PROBABILITY THEORY               |  |
| % GROUPS          |           | SET THEORY                       |  |
| % SECTIONS        |           | SUBDIVISIONS                     |  |
| SET THEORY        |           | SUBSIDIARIES                     |  |
| SUBGROUPS         |           |                                  |  |
| SUBSIDIARIES      |           | SUBHARMONIC GENERATORS           |  |
|                   |           | 0701 0905 1601                   |  |
|                   |           | RT DAMPING                       |  |
|                   |           | % GENERATORS                     |  |
|                   |           | HARMONIC GENERATORS              |  |
|                   |           | HARMONIC OSCILLATORS             |  |
|                   |           | HARMONICS                        |  |
|                   |           | OSCILLATORS                      |  |
|                   |           | SIGNAL GENERATORS                |  |
|                   |           | STIMULATED EMISSION DEVICES      |  |
|                   |           |                                  |  |
|                   |           | SUBIC PROJECT                    |  |
|                   |           | USE SUBMARINE INTEGRATED CONTROL |  |
|                   |           | PROJECT                          |  |
|                   |           |                                  |  |
|                   |           | SUBJECTS                         |  |
|                   |           | 3405                             |  |
|                   |           | GS CLASSIFICATIONS               |  |
|                   |           | #SUBJECTS                        |  |
|                   |           | RT HANDBOOKS                     |  |
|                   |           | INFORMATION RETRIEVAL            |  |
|                   |           | TEXTBOOKS                        |  |
|                   |           |                                  |  |
|                   |           | SUBLATTICES                      |  |
|                   |           | USE LATTICES (MATHEMATICS)       |  |
|                   |           | SUBGROUPS                        |  |
|                   |           |                                  |  |
|                   |           | SUBLAYERS                        |  |
|                   |           | USE SUBSTRATES                   |  |
|                   |           |                                  |  |
|                   |           | SUBLETHAL DOSAGE                 |  |
|                   |           | 0405 0412                        |  |
|                   |           | GS DOSAGE                        |  |
|                   |           | #SUBLETHAL DOSAGE                |  |
|                   |           | RT DRUGS                         |  |
|                   |           |                                  |  |
|                   |           | SUBLIMATION                      |  |
|                   |           | 0602 0603 1203 2603 3501         |  |
|                   |           | GS PHASE TRANSFORMATIONS         |  |
|                   |           |                                  |  |
|                   |           | SUBGRAVITY                       |  |
|                   |           |                                  |  |
|                   |           | SUBDWARF STARS                   |  |
|                   |           | 3001 3002                        |  |
|                   |           | GS CELESTIAL BODIES              |  |
|                   |           | . STARS                          |  |
|                   |           | . #SUBDWARF STARS                |  |
|                   |           | DWARF STARS                      |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | RED DWARF STARS                  |  |
|                   |           | WHITE DWARF STARS                |  |
|                   |           |                                  |  |
|                   |           | SUBGIANT STARS                   |  |
|                   |           | 3001                             |  |
|                   |           | GS CELESTIAL BODIES              |  |
|                   |           | . STARS                          |  |
|                   |           | . #SUBGIANT STARS                |  |
|                   |           | CARBON STARS                     |  |
|                   |           | DWARF STARS                      |  |
|                   |           | GIANT STARS                      |  |
|                   |           | LATE STARS                       |  |
|                   |           | M STARS                          |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | STELLAR EVOLUTION                |  |
|                   |           | SUPERGIANT STARS                 |  |
|                   |           |                                  |  |
|                   |           | SUBGRAVITY                       |  |
|                   |           |                                  |  |
|                   |           | SUBDUCTION (GEOLOGY)             |  |
|                   |           | 1306                             |  |
|                   |           | GS GEOLOGY                       |  |
|                   |           | #SUBDUCTION (GEOLOGY)            |  |
|                   |           | EARTH MANTLE                     |  |
|                   |           | EARTHQUAKES                      |  |
|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
|                   |           | SEISMOLOGY                       |  |
|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
|                   |           |                                  |  |
|                   |           | SUBDWARF STARS                   |  |
|                   |           | 3001 3002                        |  |
|                   |           | GS CELESTIAL BODIES              |  |
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|                   |           | . #SUBDWARF STARS                |  |
|                   |           | DWARF STARS                      |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | RED DWARF STARS                  |  |
|                   |           | WHITE DWARF STARS                |  |
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|                   |           | SUBGIANT STARS                   |  |
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|                   |           | GS CELESTIAL BODIES              |  |
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|                   |           | . #SUBGIANT STARS                |  |
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|                   |           | DWARF STARS                      |  |
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|                   |           | M STARS                          |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | STELLAR EVOLUTION                |  |
|                   |           | SUPERGIANT STARS                 |  |
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|                   |           | SUBGRAVITY                       |  |
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|                   |           | SUBDUCTION (GEOLOGY)             |  |
|                   |           | 1306                             |  |
|                   |           | GS GEOLOGY                       |  |
|                   |           | #SUBDUCTION (GEOLOGY)            |  |
|                   |           | EARTH MANTLE                     |  |
|                   |           | EARTHQUAKES                      |  |
|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
|                   |           | SEISMOLOGY                       |  |
|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
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|                   |           | SUBDWARF STARS                   |  |
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|                   |           | . #SUBDWARF STARS                |  |
|                   |           | DWARF STARS                      |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | RED DWARF STARS                  |  |
|                   |           | WHITE DWARF STARS                |  |
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|                   |           | SUBGIANT STARS                   |  |
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|                   |           | . #SUBGIANT STARS                |  |
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|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | STELLAR EVOLUTION                |  |
|                   |           | SUPERGIANT STARS                 |  |
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|                   |           | SUBGRAVITY                       |  |
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|                   |           | SUBDUCTION (GEOLOGY)             |  |
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|                   |           | GS GEOLOGY                       |  |
|                   |           | #SUBDUCTION (GEOLOGY)            |  |
|                   |           | EARTH MANTLE                     |  |
|                   |           | EARTHQUAKES                      |  |
|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
|                   |           | SEISMOLOGY                       |  |
|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
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|                   |           | SUBDWARF STARS                   |  |
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|                   |           | SUBDUCTION (GEOLOGY)             |  |
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|                   |           | #SUBDUCTION (GEOLOGY)            |  |
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|                   |           | PLATES (TECTONICS)               |  |
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|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
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|                   |           | SUBGRAVITY                       |  |
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|                   |           | SUBDUCTION (GEOLOGY)             |  |
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|                   |           | #SUBDUCTION (GEOLOGY)            |  |
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|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
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|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
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|                   |           | STELLAR EVOLUTION                |  |
|                   |           | SUPERGIANT STARS                 |  |
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|                   |           | SUBGRAVITY                       |  |
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|                   |           | SUBDUCTION (GEOLOGY)             |  |
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|                   |           | GS GEOLOGY                       |  |
|                   |           | #SUBDUCTION (GEOLOGY)            |  |
|                   |           | EARTH MANTLE                     |  |
|                   |           | EARTHQUAKES                      |  |
|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
|                   |           | SEISMOLOGY                       |  |
|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
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|                   |           | SUBDWARF STARS                   |  |
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|                   |           | . #SUBGIANT STARS                |  |
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|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | STELLAR EVOLUTION                |  |
|                   |           | SUPERGIANT STARS                 |  |
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|                   |           | SUBGRAVITY                       |  |
|                   |           |                                  |  |
|                   |           | SUBDUCTION (GEOLOGY)             |  |
|                   |           | 1306                             |  |
|                   |           | GS GEOLOGY                       |  |
|                   |           | #SUBDUCTION (GEOLOGY)            |  |
|                   |           | EARTH MANTLE                     |  |
|                   |           | EARTHQUAKES                      |  |
|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
|                   |           | SEISMOLOGY                       |  |
|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
|                   |           |                                  |  |
|                   |           | SUBDWARF STARS                   |  |
|                   |           | 3001 3002                        |  |
|                   |           | GS CELESTIAL BODIES              |  |
|                   |           | . STARS                          |  |
|                   |           | . #SUBDWARF STARS                |  |
|                   |           | DWARF STARS                      |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | RED DWARF STARS                  |  |
|                   |           | WHITE DWARF STARS                |  |
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|                   |           | SUBGIANT STARS                   |  |
|                   |           | 3001                             |  |
|                   |           | GS CELESTIAL BODIES              |  |
|                   |           | . STARS                          |  |
|                   |           | . #SUBGIANT STARS                |  |
|                   |           | CARBON STARS                     |  |
|                   |           | DWARF STARS                      |  |
|                   |           | GIANT STARS                      |  |
|                   |           | LATE STARS                       |  |
|                   |           | M STARS                          |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | STELLAR EVOLUTION                |  |
|                   |           | SUPERGIANT STARS                 |  |
|                   |           |                                  |  |
|                   |           | SUBGRAVITY                       |  |
|                   |           |                                  |  |
|                   |           | SUBDUCTION (GEOLOGY)             |  |
|                   |           | 1306                             |  |
|                   |           | GS GEOLOGY                       |  |
|                   |           | #SUBDUCTION (GEOLOGY)            |  |
|                   |           | EARTH MANTLE                     |  |
|                   |           | EARTHQUAKES                      |  |
|                   |           | LITHOSPHERE                      |  |
|                   |           | PLATES (TECTONICS)               |  |
|                   |           | SEISMOLOGY                       |  |
|                   |           | STRUCTURAL PROPERTIES (GEOLOGY)  |  |
|                   |           | TECTONICS                        |  |
|                   |           |                                  |  |
|                   |           | SUBDWARF STARS                   |  |
|                   |           | 3001 3002                        |  |
|                   |           | GS CELESTIAL BODIES              |  |
|                   |           | . STARS                          |  |
|                   |           | . #SUBDWARF STARS                |  |
|                   |           | DWARF STARS                      |  |
|                   |           | MAIN SEQUENCE STARS              |  |
|                   |           | RED DWARF STARS                  |  |
|                   |           | WHITE DWARF STARS                |  |
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|                   |           | SUBGIANT STARS                   |  |
|                   |           | 3001                             |  |
|                   |           | GS CELESTIAL BODIES              |  |
|                   |           | . STARS                          |  |
|                   |           | . #SUBGIANT STARS                |  |
|                   |           | CARBON STARS                     |  |
|                   |           | DWARF STARS                      |  |
|                   |           | GIANT STARS                      |  |
|                   |           |                                  |  |

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...GUIDED MISSILE SUBMARINES
...TRIDENT SUBMARINE
UNDERWATER VEHICLES
#SUBMARINES
...BALLISTIC MISSILE SUBMARINES
...GUIDED MISSILE SUBMARINES
...TRIDENT SUBMARINE
RT ANTISHIP MISSILES
ANTISHIP WARFARE
ANTISUBMARINE WARFARE
% MILITARY VEHICLES
NAVY
NUCLEAR POWERED SHIPS
SEAFARER PROJECT
SHIP HULLS
SUBMERGED BODIES

SUBMERGED BODIES
1202 1310 1702 3203
GS #SUBMERGED BODIES
DIVING (UNDERWATER)
UNDERWATER RESEARCH LABORATORIES
RT SUBMARINES
TORPEDOES
TOWED BODIES
UNDERWATER ENGINEERING
UNDERWATER PHOTOGRAPHY
UNDERWATER STRUCTURES
UNDERWATER VEHICLES
WATER IMMERSION

SUBMERGING
1202 1310 2311 3203
UF IMMERSION
RT BATHS
DIPPING
QUENCHING (COOLING)
SINKING
% SOAKING
WATER IMMERSION
WEIGHTLESSNESS SIMULATION
WETTING

SUBMERSIBLE AIRCRAFT
O207
RT % AIRCRAFT
ANTISUBMARINE WARFARE AIRCRAFT
LIGHT AIRCRAFT
% MILITARY AIRCRAFT
RECONNAISSANCE AIRCRAFT
RESEARCH AIRCRAFT
WATER TAKEOFF AND LANDING AIRCRAFT

SUBMILLIMETER WAVES
O710 2309 2402 2903

...GUIDED MISSILE SUBMARINES
SN (BELOW 1 MILLIMETER)
GS ELECTROMAGNETIC RADIATION
RADIO WAVES
..SHORT WAVE RADIATION
..#SUBMILLIMETER WAVES
RT BEAMS (RADIATION)
ELECTROMAGNETIC NOISE
FAR INFRARED RADIATION
FREQUENCIES
LARGE DEPLOYABLE REFLECTOR
MICROWAVES
MILLIMETER WAVES
WAVELENGTHS

SUBMINIATURIZATION
1002 3404
GS MINIATURIZATION
#SUBMINIATURIZATION
ELECTRONIC MODULES
RT MICROMINIATURIZATION
MINIATURE ELECTRONIC EQUIPMENT
PRINTED CIRCUITS

SUBORBITAL FLIGHT
3110 3409
RT % FLIGHT
MANNED SPACE FLIGHT
ORBITS
PARABOLIC FLIGHT
ROCKET FLIGHT
SPACE FLIGHT
WEIGHTLESSNESS

SUBREFLECTORS
2306 2310
RT CASSEGRAIN ANTENNAS
CONDUCTORS
REFLECTOR ANTENNAS
REFLECTORS
SCANNERS

SUBROC MISSILE
3101 3401
GS MISSILES
BALLISTIC MISSILES
..FIELD ARMY BALLISTIC MISSILES
..#SUBROC MISSILE
..SURFACE TO SURFACE MISSILES
..FLEET BALLISTIC MISSILES
..#SUBROC MISSILE
UNDERWATER TO SURFACE MISSILES
SUBROC MISSILE
RT UNDERWATER TRAJECTORIES

SUBROUTINE LIBRARIES (COMPUTERS)

...GUIDED MISSILE SUBMARINES
O802
GS COMPUTER PROGRAMS
COMPUTER SYSTEMS PROGRAMS
SUBROUTINE LIBRARIES (COMPUTERS)
RT SUBROUTINES

SUBROUTINES
O802 O803
GS COMPUTER PROGRAMS
SUBROUTINES
DATA CONVERSION ROUTINES
SUBROUTINES
RT COMPILERS
PARSING ALGORITHMS
SUBROUTINE LIBRARIES (COMPUTERS)
USER MANUALS (COMPUTER PROGRAMS)

SUBSETS (MATHEMATICS)
USE SET THEORY

SUBSIDIARIES
O603 1305 1306
RT ISOSTASY
MINES (EXCAVATIONS)
SETTLING

SUBSIDIARIES
3406
RT % DIVISION
% SECTIONS
SUBDIVISIONS
SUBGROUPS

% SUBSONIC AIRCRAFT
O201 O204 O207
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT % AIRCRAFT
FLYING PLATFORMS
GENERAL AVIATION AIRCRAFT
GETOL AIRCRAFT
GLIDERS
GROUND EFFECT MACHINES
HELICOPTERS
JET AIRCRAFT
LIGHT AIRCRAFT
PARAGLIDERS
PASSENGER AIRCRAFT
ROTARY WING AIRCRAFT
SHORT TAKEOFF AIRCRAFT
SUPERSONIC AIRCRAFT
TANDEM WING AIRCRAFT
TERRAIN FOLLOWING AIRCRAFT
TRAINING AIRCRAFT

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[illegible]

|                                     |                      |                                  |
|-------------------------------------|----------------------|----------------------------------|
| USE SA-321 HELICOPTER               | 0409 0505            | RT HYPNOSIS                      |
| SUD AVIATION SA-330 HELICOPTER      | GS FARM CROPS        |                                  |
| USE SA-330 HELICOPTER               | #SUGAR BEETS         |                                  |
|                                     | PLANTS (BOTANY)      |                                  |
| SUD AVIATION SE-210 AIRCRAFT        | #SUGAR BEETS         | SUHL EFFECT                      |
| USE SE-210 AIRCRAFT                 | AGRICULTURE          | 2302 2307 2602                   |
|                                     | BOTANY               | RT CARRIER INJECTION             |
|                                     | CROP GROWTH          | % EFFECTS                        |
|                                     | CROP VIGOR           | ELECTRONS                        |
| SUD AVIATION SE-3160 HELICOPTER     | EARTH RESOURCES      | EXCITONS                         |
| USE SE-3160 HELICOPTER              | FARMLANDS            | HOLES (ELECTRON DEFICIENCIES)    |
|                                     | IRRIGATION           | MAGNETIC FIELDS                  |
| SUD VJ-101 AIRCRAFT                 | SEEDS                | N-TYPE SEMICONDUCTORS            |
| USE VJ-101 AIRCRAFT                 | SUGARS               | RECOMBINATION REACTIONS          |
|                                     |                      | SUITABILITY                      |
| SUDAN                               |                      | 3408                             |
| 1305                                | SUGAR CANE           | RT ACCEPTABILITY                 |
| GS                                  | 0409 0505            | COMPATIBILITY                    |
| #SUDAN                              | GS FARM CROPS        |                                  |
| RT AFRICA                           | #SUGAR CANE          |                                  |
|                                     | PLANTS (BOTANY)      |                                  |
| SUDDEN ENHANCEMENT OF ATMOSPHERICS  | #SUGAR CANE          | SUITS                            |
| 0704 1302 2003 2304                 | AGRICULTURE          | 0508 3305                        |
| GS                                  | BOTANY               | GS CLOTHING                      |
| ELECTROMAGNETIC INTERFERENCE        | CROP GROWTH          | #SUITS                           |
| .RADIO FREQUENCY INTERFERENCE       | CROP VIGOR           | ..PRESSURE SUITS                 |
| ...ELECTROMAGNETIC NOISE            | EARTH RESOURCES      | ...SPACE SUITS                   |
| ...ATMOSPHERICS                     | FARMLANDS            | ...EXTRAVEHICULAR MOBILITY UNITS |
| ...#SUDDEN ENHANCEMENT OF           | % FOOD               | RT GARMENTS                      |
| ATMOSPHERICS                        | IRRIGATION           |                                  |
| SUDDEN IONOSPHERIC DISTURBANCES     | SEEDS                | SULFATES                         |
| 0704 1302 2003 2304 3009            |                      | 0603 1805                        |
| UF GEOMAGNETIC CROTCHETS            |                      | GS SULFUR COMPOUNDS              |
| SID (IONOSPHERIC DISTURBANCES)      |                      | #SULFATES                        |
| GS IONOSPHERIC DISTURBANCES         |                      | ..ALUM                           |
| .IONOSPHERIC STORMS                 | SUGARS               | ..AMMONIUM SULFATES              |
| .#SUDDEN IONOSPHERIC DISTURBANCES   | 0403 0505 1808       | ..BARITE                         |
| STORMS                              | GS ORGANIC COMPOUNDS | ..HYDROXYLAMINE SULFATE          |
| .IONOSPHERIC STORMS                 | .CARBOHYDRATES       | ..LITHIUM SULFATES               |
| .#SUDDEN IONOSPHERIC DISTURBANCES   | .#SUGARS             | ..MAGNESIUM SULFATES             |
| STORMS                              | ...DEXTRANS          | ..HEXAHEDRITE                    |
| .IONOSPHERIC STORMS                 | ...INOSITOLS         | ..SODIUM SULFATES                |
| .#SUDDEN IONOSPHERIC DISTURBANCES   | ...LACTOSE           | GYP SUM                          |
| MAGNETIC DISTURBANCES               | ...MANNITOL          | SULFURIC ACID                    |
| MAGNETIC STORMS                     | ...HEXOSES           |                                  |
| SOLAR ACTIVITY EFFECTS              | ...GALACTOSE         | SULFATION                        |
| TRAVELLING IONOSPHERIC DISTURBANCES | ...GLUCOSE           | 0602 0603                        |
|                                     | ...PENTOSE           | GS CHEMICAL REACTIONS            |
| SUDDEN STORM COMMENCEMENTS          | ...RIBOSE            | #SULFATION                       |
| 0710 1302                           | ...XYLOSE            | RT HYDROMETALLURGY               |
| RT                                  | ...SUCROSE           | SULFIDATION                      |
| MAGNETIC DISTURBANCES               | SUGAR BEETS          |                                  |
| MAGNETIC STORMS                     | RT % FOOD            | SULFIDATION                      |
| SOLAR ACTIVITY EFFECTS              | SUGGESTION           | 1704                             |
| SOLAR CORPUSCULAR RADIATION         | 0408 0410            | GS CHEMICAL REACTIONS            |
| SOLAR FLARES                        | GS RECOMMENDATIONS   | #SULFIDATION                     |
| STORMS                              | #SUGGESTION          | CORROSION RESISTANCE             |
|                                     |                      | GAS-METAL INTERACTIONS           |
| SUGAR BEETS                         |                      |                                  |

## NASA THESAURUS HIERARCHICAL UPDATE

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...SULFUR DIOXIDES
..SULFUR OXIDES
..SULFUR DIOXIDES
SULFUR COMPOUNDS
.SULFUR OXIDES
.SULFUR DIOXIDES
.SULFUR DIOXIDES
.SULFUR DIOXIDES

SULFUR FLUORIDES
O603 1804 1805
GS HALOGEN COMPOUNDS
.FLUORINE COMPOUNDS
..FLUORIDES
..SULFUR FLUORIDES
...SULFUR HEXAFLUORIDE
.HALIDES
..FLUORIDES
..SULFUR FLUORIDES
...SULFUR HEXAFLUORIDE
SULFUR COMPOUNDS
.SULFUR FLUORIDES
..SULFUR HEXAFLUORIDE

SULFUR HEXAFLUORIDE
O603 1203 1301 1302 2404
GS GASES
#SULFUR HEXAFLUORIDE
HALOGEN COMPOUNDS
.FLUORINE COMPOUNDS
..FLUORIDES
...SULFUR FLUORIDES
...SULFUR HEXAFLUORIDE
.HALIDES
..FLUORIDES
...SULFUR FLUORIDES
...SULFUR HEXAFLUORIDE
SULFUR COMPOUNDS
.SULFUR FLUORIDES
.SULFUR HEXAFLUORIDE

RT % CHEMICAL COMPOUNDS
DIELECTRICS
INFRARED SPECTROSCOPY
LASER MATERIALS
WORKING FLUIDS

SULFUR ISOTOPES
O603 1805 1807
GS CHEMICAL ELEMENTS
.SULFUR
.SULFUR ISOTOPES

SULFUR OXIDES
O603 1804 1805
GS CHALCOGENIDES
.OXIDES
.SULFUR OXIDES

...SULFUR DIOXIDES
SULFUR COMPOUNDS
#SULFUR OXIDES
..SULFUR DIOXIDES
.SULFUR DIOXIDES
ACID RAIN
DIOXIDES

RT

SULFURIC ACID
O603 1803
GS ACIDS
#SULFURIC ACID
SULFUR COMPOUNDS
#SULFURIC ACID
SULFATES

RT

SUM RULES
1902
GS RULES
#SUM RULES
SUMS

RT

SUMMARIES
3405
GS #SUMMARIES
.ABSTRACTS
.PRELAUNCH SUMMARIES
RT ANNOTATIONS
BIBLIOGRAPHIES
DOCUMENTATION
INDEXES (DOCUMENTATION)
INFORMATION DISSEMINATION
POSTLAUNCH REPORTS
REPORTS

SUMMER
2001 2003
GS SEASONS
#SUMMER
RT AUTUMN
HOT WEATHER
SOLSTICES
SPRING (SEASON)
WINTER

SUMPS
O505 1202 1305 1504
RT DRAINAGE
PITS (EXCAVATIONS)
WASTE DISPOSAL

SUMS
1902
RT ALGEBRA
AMOUNT
ARITHMETIC

1410
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# NASA THESAURUS HIERARCHICAL UPDATE

|                                |                                 |                                |
|--------------------------------|---------------------------------|--------------------------------|
| SOLAR INTERIOR                 | SUNBLAZER SPACE PROBE           | % SCIENCE                      |
| SOLAR LIMB                     | 3108                            | SUNSET                         |
| SOLAR LONGITUDE                | GS                              | TERMINATOR LINES               |
| SOLAR MAGNETIC FIELD           | UNMANNED SPACECRAFT             |                                |
| SOLAR MAXIMUM MISSION          | . SPACE PROBES                  |                                |
| SOLAR MAXIMUM MISSION-A        | ..SOLAR PROBES                  | SUNSET                         |
| SOLAR MESOSPHERE EXPLORER      | ..#SUNBLAZER SPACE PROBE        | 1901 2003 3001                 |
| SOLAR NEIGHBORHOOD             | MULTISTAGE ROCKET VEHICLES      | RT EVENING                     |
| SOLAR NEUTRINOS                | SOLID PROPELLANT ROCKET ENGINES | % SCIENCE                      |
| SOLAR OBLATENESS               |                                 | SUNRISE                        |
| SOLAR OBSERVATORIES            | SUNFLOWERS                      | TERMINATOR LINES               |
| SOLAR ORBITS                   | O409                            |                                |
| SOLAR OSCILLATIONS             | GS                              | SUNSPOT CYCLE                  |
| SOLAR PARALLAX                 | FARM CROPS                      | 2003 2902 3001                 |
| SOLAR PHYSICS                  | #SUNFLOWERS                     | GS CYCLES                      |
| SOLAR PONDS (HEAT STORAGE)     | PLANTS (BOTANY)                 | .SOLAR CYCLES                  |
| SOLAR POSITION                 | #SUNFLOWERS                     | .#SUNSPOT CYCLE                |
| SOLAR POWER SATELLITES         | AGRICULTURE                     | SOLAR ACTIVITY                 |
| SOLAR POWERED AIRCRAFT         | CROP IDENTIFICATION             | STARSPTS                       |
| SOLAR PROBES                   | % CROPS                         | STELLAR ACTIVITY               |
| SOLAR PROMINENCES              | EARTH RESOURCES                 |                                |
| SOLAR PROPULSION               | SUNGLASSES                      | SUNSPOTS                       |
| SOLAR PROTONS                  | O508                            | 2902 3001                      |
| SOLAR RADAR ECHOES             | RT                              | GS STELLAR ACTIVITY            |
| SOLAR RADIATION                | EYE PROTECTION                  | .SOLAR ACTIVITY                |
| SOLAR RADIATION SHIELDING      | EYEPIECES                       | .#SUNSPOTS                     |
| SOLAR RADIATION 1 SATELLITE    | GOGGLES                         | .STARSPTS                      |
| SOLAR RADIATION 3 SATELLITE    | OPTICAL FILTERS                 | .#SUNSPOTS                     |
| SOLAR RADIO BURSTS             | VISORS                          | RT                             |
| SOLAR REFLECTORS               |                                 | FACULAE                        |
| SOLAR ROTATION                 | SUNLIGHT                        | MAGNETIC DISTURBANCES          |
| SOLAR SAILS                    | 2306 2902 3303                  | PHOTOSPHERE                    |
| SOLAR SEA POWER PLANTS         | GS                              | SOLAR CYCLES                   |
| SOLAR SENSORS                  | ELECTROMAGNETIC RADIATION       | SOLAR FLARES                   |
| SOLAR SIMULATION               | .LIGHT (VISIBLE RADIATION)      | SOLAR TERRESTRIAL INTERACTIONS |
| SOLAR SIMULATORS               | .#SUNLIGHT                      | TWENTY-SEVEN DAY VARIATION     |
| SOLAR SPECTRA                  | EXTRATERRESTRIAL RADIATION      |                                |
| SOLAR SPECTROMETERS            | .SOLAR RADIATION                |                                |
| SOLAR STORMS                   | .#SUNLIGHT                      | SUPER FORTRESS AIRCRAFT        |
| SOLAR SYSTEM                   | BLACK BODY RADIATION            | USE RB-50 AIRCRAFT             |
| SOLAR SYSTEM EVOLUTION         | CIRCUMSOLAR RADIATION           |                                |
| SOLAR TEMPERATURE              | CLIMATOLOGY                     | SUPER SABRE AIRCRAFT           |
| SOLAR TERRESTRIAL INTERACTIONS | CLOUD COVER                     | USE F-100 AIRCRAFT             |
| SOLAR THERMAL PROPULSION       | INFRARED RADIATION              | SUPERALLOYS                    |
| SOLAR TOTAL ENERGY SYSTEMS     | INSOLATION                      | USE HEAT RESISTANT ALLOYS      |
| SOLAR VELOCITY                 | SKY                             | SUPERCAVITATING FLOW           |
| SOLAR WIND                     | SKY BRIGHTNESS                  | O101 O102 1202 1203            |
| SOLAR WIND VELOCITY            | SKY RADIATION                   | UF SUPERCAVITATION             |
| SOLAR X-RAYS                   | SOLAR HEATING                   | GS FLUID FLOW                  |
| SUNLIGHT                       | SUN                             | .TURBULENT FLOW                |
| ULYSSES MISSION                | THERMAL RADIATION               | .#SUPERCAVITATING FLOW         |
|                                | ULTRAVIOLET RADIATION           | CAVITATION FLOW                |
|                                | UMKEHR EFFECT                   | RT                             |
|                                | ZODIACAL LIGHT                  | HYDROFOIL OSCILLATIONS         |
| SUN SENSORS                    | SUNRISE                         |                                |
| USE SOLAR SENSORS              | 1302 1901 2003 3001             | SUPERCAVITATION                |
|                                | RT MORNING                      | USE SUPERCAVITATING FLOW       |

SUPERCHARGERS  
 0201 0202 1504 2801 2805 2808  
 UF SUPERCHARGING  
 GS TURBOCHARGERS  
 COMPRESSORS  
 #SUPERCHARGERS  
 RT AIR INTAKES  
 BLOWERS  
 CENTRIFUGAL COMPRESSORS  
 COMPRESSING  
 INTERNAL COMBUSTION ENGINES  
 TURBOCOMPRESSORS  
 TURBOMACHINERY

SUPERCHARGING  
 USE SUPERCHARGERS  
 SUPERCOMPUTERS  
 3502  
 GS DATA PROCESSING EQUIPMENT  
 .COMPUTERS  
 .#SUPERCOMPUTERS  
 ...CONNECTION MACHINE  
 ...GRAY COMPUTERS  
 ARCHITECTURE (COMPUTERS)  
 HYPERCUBE MULTIPROCESSORS  
 MULTIPROCESSING (COMPUTERS)  
 PARALLEL PROCESSING (COMPUTERS)

SUPERCONDUCTING CAVITY RESONATORS  
 0705 0710 1002 1610 2302 2303 2304  
 2310 2402 2403 2603  
 GS RESONATORS  
 .CAVITY RESONATORS  
 .#SUPERCONDUCTING CAVITY RESONATORS  
 SUPERCONDUCTING DEVICES  
 #SUPERCONDUCTING CAVITY RESONATORS  
 MICROWAVE OSCILLATORS  
 OSCILLATORS  
 SUPERCONDUCTING FILMS  
 SUPERCONDUCTING MAGNETS

SUPERCONDUCTING DEVICES  
 1002 2302 2303 2304 2603  
 GS #SUPERCONDUCTING DEVICES  
 .SIS (SUPERCONDUCTORS)  
 .SQUID (DETECTORS)  
 .SUPERCONDUCTING CAVITY RESONATORS  
 .SUPERCONDUCTING MAGNETS  
 SUPERCONDUCTING FILMS  
 SUPERCONDUCTING POWER TRANSMISSION  
 SUPERCONDUCTING SUPER COLLIDER  
 TUNNEL JUNCTIONS

SUPERCONDUCTING FILMS  
 1503 1506 1704 1802  
 RT BSCCO SUPERCONDUCTORS  
 % FILMS  
 LASER DEPOSITION  
 PULSED LASER DEPOSITION  
 SEMICONDUCTING FILMS  
 SUPERCONDUCTING CAVITY RESONATORS  
 SUPERCONDUCTING DEVICES  
 SUPERCONDUCTORS  
 THICK FILMS  
 THIN FILMS  
 YBCO SUPERCONDUCTORS

SUPERCONDUCTING MAGNETS  
 1704 2302 2304 2307 2604  
 GS MAGNETS  
 .ELECTROMAGNETS  
 .#SUPERCONDUCTING MAGNETS  
 SUPERCONDUCTING DEVICES  
 #SUPERCONDUCTING MAGNETS  
 CRYOGENIC MAGNETS  
 FLUX PUMPS  
 HIGH FIELD MAGNETS  
 HIGH TEMPERATURE SUPERCONDUCTORS  
 MAGNET COILS  
 MAGNETIC ENERGY STORAGE  
 SUPERCONDUCTING CAVITY RESONATORS  
 SUPERCONDUCTING SUPER COLLIDER

SUPERCONDUCTING POWER TRANSMISSION  
 1002 2304 2402  
 RT % CONDUCTIVITY  
 CRYOGENICS  
 ELECTRIC POWER TRANSMISSION  
 HIGH TEMPERATURE SUPERCONDUCTORS  
 LOW TEMPERATURE PHYSICS  
 POWER LINES  
 SUPERCONDUCTING DEVICES  
 TRANSITION TEMPERATURE  
 TRANSMISSION LINES

SUPERCONDUCTING QUANTUM INTERFEROMETERS  
 USE SQUID (DETECTORS)  
 SUPERCONDUCTING SUPER COLLIDER  
 2202 2403 2405  
 GS PARTICLE ACCELERATORS  
 #SUPERCONDUCTING SUPER COLLIDER  
 RT STORAGE RINGS (PARTICLE  
 ACCELERATORS)  
 SUPERCONDUCTING DEVICES  
 SUPERCONDUCTING MAGNETS

SUPERCONDUCTIVITY

SUPERCONDUCTING FILMS  
 1002 2302 2303 2304 2603  
 UF MEISSNER EFFECT  
 GS ELECTRICAL PROPERTIES  
 .ELECTRICAL RESISTIVITY  
 .#SUPERCONDUCTIVITY  
 ...KONDO EFFECT  
 TRANSPORT PROPERTIES  
 .ELECTRICAL RESISTIVITY  
 .#SUPERCONDUCTIVITY  
 ...KONDO EFFECT  
 ABRIKOSOV THEORY  
 BCS THEORY  
 BLOCH BAND  
 % CONDUCTIVITY  
 CRYOGENICS  
 CRYOTRONS  
 ELECTRON PHONON INTERACTIONS  
 ELECTRON TUNNELING  
 FLUX PINNING  
 FLUX PUMPS  
 GALLIUM ALLOYS  
 HIGH TEMPERATURE SUPERCONDUCTORS  
 JOSEPHSON JUNCTIONS  
 LANDAU FACTOR  
 LANDAU-GINZBURG EQUATIONS  
 LOW TEMPERATURE PHYSICS  
 % SOLID STATE PHYSICS  
 SPIN GLASS  
 TRANSITION TEMPERATURE  
 TRAPPED MAGNETIC FIELDS  
 VECTOR CURRENTS  
 VORTICES  
 YBCO SUPERCONDUCTORS

SUPERCONDUCTOR INSULATOR SUPERCONDUCTORS  
 USE SIS (SUPERCONDUCTORS)

SUPERCONDUCTORS  
 1002 2302 2303 2603  
 GS CONDUCTORS  
 #SUPERCONDUCTORS  
 ...HIGH TEMPERATURE SUPERCONDUCTORS  
 ...BSCCO SUPERCONDUCTORS  
 ...YBCO SUPERCONDUCTORS  
 ...ORGANIC SUPERCONDUCTORS  
 ABRIKOSOV THEORY  
 CARRIER MOBILITY  
 CRYOGENIC COMPUTER STORAGE  
 CRYOTRONS  
 ELECTRON GAS  
 ENERGY STORAGE  
 FLUX QUANTIZATION  
 PINNING  
 PROXIMITY EFFECT (ELECTRICITY)  
 SOLID STATE DEVICES

## NASA THESAURUS HIERARCHICAL UPDATE

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UF KU BAND
S BAND
X BAND
FREQUENCIES
.RADIO FREQUENCIES
..MICROWAVE FREQUENCIES
..#SUPERHIGH FREQUENCIES
RT C BAND
CENTIMETER WAVES
UNIFIED S BAND
VSAT (NETWORK)

SUPERHYBRID MATERIALS
1507
GS COMPOSITE MATERIALS
#SUPERHYBRID MATERIALS
..GRAPHITE-EPOXY COMPOSITES
BORON-EPOXY COMPOSITES
CARBON FIBER REINFORCED PLASTICS
FIBER COMPOSITES
HYBRID COMPOSITES
% MATERIALS
REINFORCING FIBERS

SUPERIMPOSITION (MATHEMATICS)
USE SUPERPOSITION (MATHEMATICS)

SUPERLATTICES
2601
GS CRYSTAL LATTICES
#SUPERLATTICES
SEMICONDUCTORS (MATERIALS)
#SUPERLATTICES
RT CRYSTAL DISLOCATIONS
CRYSTAL STRUCTURE
GALLIUM ARSENIDES
LATTICE PARAMETERS

SUPERMAGNETS
USE HIGH FIELD MAGNETS

SUPERMASSIVE STARS
1901 3001
GS CELESTIAL BODIES
.STARS
.#SUPERMASSIVE STARS
RT DEGENERATE MATTER
MASSIVE STARS
STELLAR MODELS
STELLAR STRUCTURE

SUPERNOVA REMNANTS
3001
RT BLACK HOLES (ASTRONOMY)
NEUTRON STARS

NORTH POLAR SPUR (ASTRONOMY)
PULSARS
RED DWARF STARS
SUPERNOVAE
WHITE DWARF STARS
WHITE HOLES (ASTRONOMY)

SUPERNOVA 1987A
3001 3003
GS CELESTIAL BODIES
.STARS
..VARIABLE STARS
...SUPERNOVAE
...#SUPERNOVA 1987A
RT MAGELLANIC CLOUDS

SUPERNOVAE
3001 3003
GS CELESTIAL BODIES
.STARS
..VARIABLE STARS
...SUPERNOVAE
....SUPERNOVA 1987A
RT CRAB NEBULA
GRAVITATIONAL COLLAPSE
NEBULAE
NOVAE
OPIK THEORY
ORION NEBULA
STELLAR MASS
STELLAR MASS EJECTION
STELLAR PHYSICS
SUPERNOVA REMNANTS

SUPEROXIDES
USE INORGANIC PEROXIDES

SUPERPLASTICITY
1809 2603 3202 3204
GS MECHANICAL PROPERTIES
.PLASTIC PROPERTIES
.#SUPERPLASTICITY
RT CREEP PROPERTIES
CRYSTAL DISLOCATIONS
ELONGATION
EUTECTIC ALLOYS
HEAT RESISTANT ALLOYS
PLASTIC DEFORMATION
PLASTIC FLOW

SUPERPOSITION (MATHEMATICS)
1902 2301 2309 2310
UF SUPERIMPOSITION (MATHEMATICS)
RT EQUIVALENT CIRCUITS
LINEAR CIRCUITS

NORTH POLAR SPUR (ASTRONOMY)
PULSARS
RED DWARF STARS
SUPERNOVAE
WHITE DWARF STARS
WHITE HOLES (ASTRONOMY)

SUPERNOVA 1987A
3001 3003
GS CELESTIAL BODIES
.STARS
..VARIABLE STARS
...SUPERNOVAE
...#SUPERNOVA 1987A
RT MAGELLANIC CLOUDS

SUPERNOVAE
3001 3003
GS CELESTIAL BODIES
.STARS
..VARIABLE STARS
...SUPERNOVAE
....SUPERNOVA 1987A
RT CRAB NEBULA
GRAVITATIONAL COLLAPSE
NEBULAE
NOVAE
OPIK THEORY
ORION NEBULA
STELLAR MASS
STELLAR MASS EJECTION
STELLAR PHYSICS
SUPERNOVA REMNANTS

SUPEROXIDES
USE INORGANIC PEROXIDES

SUPERPLASTICITY
1809 2603 3202 3204
GS MECHANICAL PROPERTIES
.PLASTIC PROPERTIES
.#SUPERPLASTICITY
RT CREEP PROPERTIES
CRYSTAL DISLOCATIONS
ELONGATION
EUTECTIC ALLOYS
HEAT RESISTANT ALLOYS
PLASTIC DEFORMATION
PLASTIC FLOW

SUPERPOSITION (MATHEMATICS)
1902 2301 2309 2310
UF SUPERIMPOSITION (MATHEMATICS)
RT EQUIVALENT CIRCUITS
LINEAR CIRCUITS

% MATHEMATICS
NETWORK ANALYSIS
NETWORK SYNTHESIS

SUPERPRESSURE BALLOONS
3202
UF CONSTANT VOLUME BALLOONS
TETROONS
EXPANDABLE STRUCTURES
.INFLATABLE STRUCTURES
..BALLOONS
...HIGH ALTITUDE BALLOONS
...#SUPERPRESSURE BALLOONS
RT BALLOON SOUNDING
METEOROLOGICAL BALLOONS

SUPERROTATION
1504
RT ATMOSPHERIC CIRCULATION
EARTH ATMOSPHERE
EARTH ROTATION
ROTATING FLUIDS

SUPERSATURATION
0602 0603 2601
RT CONDENSING
CRYSTALLIZATION
HEAT TREATMENT
MAYER PROBLEM
PRECIPITATION (CHEMISTRY)
PRECIPITATION HARDENING
QUENCHING (COOLING)
SOLID SOLUTIONS
SUPERCOOLING

SUPERSONIC AIRCRAFT
0201 0204
SN (AIRCRAFT DESIGNED TO FLY AT
SPEEDS ABOVE MACH 1 AND BELOW MACH
5)
UF TRANSONIC AIRCRAFT
GS #SUPERSONIC AIRCRAFT
.A-5 AIRCRAFT
.B-58 AIRCRAFT
.B-70 AIRCRAFT
.BOEING 733 AIRCRAFT
.D-558 AIRCRAFT
.F-5 AIRCRAFT
.F-8 AIRCRAFT
.F-14 AIRCRAFT
.F-15 AIRCRAFT
.F-16 AIRCRAFT
.F-17 AIRCRAFT
.F-22 AIRCRAFT
.F-100 AIRCRAFT

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# NASA THESAURUS HIERARCHICAL UPDATE

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.F-101 AIRCRAFT
.F-102 AIRCRAFT
.F-104 AIRCRAFT
.F-106 AIRCRAFT
.F-111 AIRCRAFT
.FIREBEE 2 TARGET DRONE AIRCRAFT
.G-95/4 AIRCRAFT
.JAGUAR AIRCRAFT
.MIG AIRCRAFT
.MIRAGE AIRCRAFT
.MIRAGE 3 AIRCRAFT
.NORD 1500 AIRCRAFT
.P-1154 AIRCRAFT
.PHANTOM AIRCRAFT
..F-4 AIRCRAFT
..RF-4 AIRCRAFT
..SAAB 37 AIRCRAFT
..SR-71 AIRCRAFT
.SUPERSONIC TRANSPORTS
..CL-823 AIRCRAFT
..CONCORDE AIRCRAFT
..L-2000 AIRCRAFT
..SUPERSONIC COMMERCIAL AIR
TRANSPORT
...BOEING 2707 AIRCRAFT
..T-38 AIRCRAFT
..TSR-2 AIRCRAFT
.VJ-101 AIRCRAFT
.X-1 AIRCRAFT
.X-2 AIRCRAFT
.X-3 AIRCRAFT
.X-15 AIRCRAFT
RT % AIRCRAFT
ATTACK AIRCRAFT
FIGHTER AIRCRAFT
HYPERSONIC AIRCRAFT
JET AIRCRAFT
PASSENGER AIRCRAFT
RECONNAISSANCE AIRCRAFT
RESEARCH AIRCRAFT
% SUBSONIC AIRCRAFT
SUPERSONIC CRUISE AIRCRAFT RESEARCH
SUPERSONICS
SWEEPBACK WINGS
TRANSPORT AIRCRAFT
TRAPEZOIDAL TAIL SURFACES
VARIABLE CYCLE ENGINES
VARIABLE STREAM CONTROL ENGINES

SUPERSONIC AIRFOILS
O101 O102 O104 O201
GS AIRFOILS
#SUPERSONIC AIRFOILS
RT SWEEPBACK
SWEEPBACK TAIL SURFACES

SUPERSONIC AIRCRAFT
.SUPERSONIC TRANSPORTS
.#SUPERSONIC COMMERCIAL AIR
TRANSPORT
...BOEING 2707 AIRCRAFT

SUPERSONIC COMPRESSORS
1203 2801 2805 3501
GS COMPRESSORS
#SUPERSONIC COMPRESSORS
RT OBLIQUE SHOCK WAVES
TRANSONIC COMPRESSORS
TURBOCOMPRESSORS

SUPERSONIC CRUISE AIRCRAFT RESEARCH
O201
UF SCAR PROGRAM
GS PROGRAMS
.NASA PROGRAMS
.#SUPERSONIC CRUISE AIRCRAFT
RESEARCH
RT % AIRCRAFT
SUPERSONIC AIRCRAFT
SUPERSONIC TRANSPORTS

SUPERSONIC DIFFUSERS
1203 2801 2805 3501
RT AIR INTAKES
% DIFFUSERS
EXHAUST DIFFUSERS
FLOW STABILITY
VANELESS DIFFUSERS

SUPERSONIC DRAG
O101 O102 O204 1203 3501
GS AERODYNAMIC CHARACTERISTICS
.AERODYNAMIC DRAG
.#SUPERSONIC DRAG
AERODYNAMIC FORCES
.AERODYNAMIC DRAG
.#SUPERSONIC DRAG
DYNAMIC CHARACTERISTICS
.DRAG
..FRICTION DRAG
...AERODYNAMIC DRAG
...#SUPERSONIC DRAG
..PRESSURE DRAG
..#SUPERSONIC DRAG
FRICTION
..FLOW RESISTANCE
..FRICTION DRAG
...AERODYNAMIC DRAG
...#SUPERSONIC DRAG
..SKIN FRICTION
..FRICTION DRAG

SWEEPBACK WINGS
SUPERSONIC BOUNDARY LAYERS
O101 1202
GS BOUNDARY LAYERS
#SUPERSONIC BOUNDARY LAYERS
RT FLUID FLOW
LAMINAR BOUNDARY LAYER
SUPERSONICS
TURBULENT BOUNDARY LAYER
TWO DIMENSIONAL BOUNDARY LAYER

SUPERSONIC COMBUSTION
2801 2805 3301
GS COMBUSTION
#SUPERSONIC COMBUSTION
RT ENGINES
FUEL COMBUSTION

SUPERSONIC COMBUSTION RAMJET ENGINES
2805 3101
UF SCRAMJET ENGINES
SCRAMJETS
GS ENGINES
.AIR BREATHING ENGINES
..GAS TURBINE ENGINES
...JET ENGINES
....RAMJET ENGINES
....#SUPERSONIC COMBUSTION RAMJET
ENGINES
.INTERNAL COMBUSTION ENGINES
..GAS TURBINE ENGINES
...JET ENGINES
....RAMJET ENGINES
....#SUPERSONIC COMBUSTION RAMJET
ENGINES
.TURBINE ENGINES
..GAS TURBINE ENGINES
...JET ENGINES
....RAMJET ENGINES
....#SUPERSONIC COMBUSTION RAMJET
ENGINES
RT COMBUSTION
MISSILES
RAMJET MISSILES
% SCRAM

SUPERSONIC COMMERCIAL AIR TRANSPORT
O204
UF SCAT
GS COMMERCIAL AIRCRAFT
#SUPERSONIC COMMERCIAL AIR
TRANSPORT
..BOEING 2707 AIRCRAFT
..TU-144 AIRCRAFT

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[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|    |                                                                                                                                                                                                                                                                                                                                                                                |    |                                                                                                                                                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                                                            |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | .#SUPERSONIC WIND TUNNELS<br>BLOWDOWN WIND TUNNELS<br>HYPERSONIC WIND TUNNELS<br>HYPERVELOCITY WIND TUNNELS<br>LOW DENSITY WIND TUNNELS<br>SHOCK TUNNELS<br>SLOTTED WIND TUNNELS<br>SUBSONIC WIND TUNNELS<br>SUPERHARMONICS<br>TRANSONIC WIND TUNNELS                                                                                                                          | RT | ACCELERATION PROTECTION<br>PRONE POSITION<br>REST<br>SITTING POSITION<br>SUPPLEMENTS<br>3402 3404 3406<br>GS DOCUMENTS<br>#SUPPLEMENTS<br>RT CONTRACTS<br>EXTENSIONS<br>INDEXES (DOCUMENTATION)<br>MOTION PICTURES<br>RECORDS<br>REPORTS<br>SUPPLYING<br>1202 3402 3404<br>RT COMMERCE<br>CONSUMPTION<br>DEMAND (ECONOMICS)<br>FILLING<br>INJECTION<br>INPUT<br>MARKETING<br>OUTPUT | GS | #SUPPORTS<br>.PYLONS<br>.SADDLES (SUPPORTS)<br>.TRIPODS<br>BEARINGS<br>CARRIAGES<br>CHASSIS<br>FOUNDATIONS<br>FRAMES<br>GIMBALS<br>% HEADERS<br>LUGS<br>PIVOTS<br>% PLATFORMS<br>PYLON MOUNTING<br>RACKS (FRAMES)<br>REINFORCEMENT (STRUCTURES)<br>SHAFTS (MACHINE ELEMENTS)<br>STRUTS<br>SUBSTRUCTURES<br>SUPPORT INTERFERENCE<br>% SUSTAINING<br>TRUSSES |
|    | SUPERSONICS<br>O101 0102 0205 1110 1202 1203 1308<br>GS FLUID MECHANICS<br>.FLUID DYNAMICS<br>..GAS DYNAMICS<br>...AERODYNAMICS<br>...#SUPERSONICS<br>AEROTHERMODYNAMICS<br>HYPERSONICS<br>MACH CONES<br>SUPERHARMONICS<br>SUPERSONIC AIRCRAFT<br>SUPERSONIC BOUNDARY LAYERS<br>SUPERSONIC FLIGHT<br>SUPERSONIC HEAT TRANSFER<br>SUPERSONIC SPEED<br>SUPERSONIC TEST APPARATUS |    | SUPPORT INTERFERENCE<br>O705 0710 2402<br>RT ANTENNA RADIATION PATTERNS<br>% INTERFERENCE<br>SUPPORTS<br>VIBRATION EFFECTS                                                                                                                                                                                                                                                          |    | SUPPRESSION<br>USE RETARDING                                                                                                                                                                                                                                                                                                                               |
|    | SUPERSTRING THEORY<br>USE STRING THEORY                                                                                                                                                                                                                                                                                                                                        |    |                                                                                                                                                                                                                                                                                                                                                                                     |    | SUPPRESSORS<br>O701 0704 0705<br>GS #SUPPRESSORS<br>.ECHO SUPPRESSORS<br>RT ABSORBERS (MATERIALS)<br>ADDITIVES<br>ATTENUATORS<br>BAFFLES<br>CIRCUIT PROTECTION<br>DAMPING<br>INFRARED SUPPRESSION<br>INHIBITORS<br>INSULATION<br>ISOLATORS<br>MUFFLERS<br>NEUTRALIZERS<br>NOISE REDUCTION<br>RETARDANTS<br>SHIELDING<br>SILENCERS<br>SQUELCH CIRCUITS      |
|    | SUPERSYMMETRY<br>1902 2311 3001<br>GS SYMMETRY<br>#SUPERSYMMETRY<br>BROKEN SYMMETRY<br>COSMOLOGY<br>FERMIONS<br>FIELD THEORY (PHYSICS)<br>GAUGE THEORY<br>GRAND UNIFIED THEORY<br>GRAVITATION THEORY<br>GROUP THEORY<br>LIE GROUPS<br>PARTICLE THEORY<br>QUANTUM THEORY<br>STRING THEORY<br>SUPERGRAVITY<br>THEORETICAL PHYSICS<br>UNIFIED FIELD THEORY                        |    | SUPPORT SYSTEMS<br>O507 1101 1102 1109 3409<br>GS #SUPPORT SYSTEMS<br>.GROUND OPERATIONAL SUPPORT SYSTEM<br>.GROUND SUPPORT SYSTEMS<br>.LIFE SUPPORT SYSTEMS<br>.BIOPAKS<br>.CLOSED ECOLOGICAL SYSTEMS<br>.EMERGENCY LIFE SUSTAINING SYSTEMS<br>...AEPS<br>...PORTABLE LIFE SUPPORT SYSTEMS<br>...AEPS<br>...IMLSS<br>RT SELF SEALING<br>SERVICES<br>% SYSTEMS                      |    |                                                                                                                                                                                                                                                                                                                                                            |
|    | SUPINE POSITION<br>O401 0502 0506                                                                                                                                                                                                                                                                                                                                              |    | SUPPORTS<br>1501 1504 3202<br>UF MOUNTS<br>STANDS                                                                                                                                                                                                                                                                                                                                   |    | SURFACE ACOUSTIC WAVE DEVICES<br>O803 1002 1413<br>UF S-A-W DEVICES<br>RT ACOUSTIC DELAY LINES<br>BULK ACOUSTIC WAVE DEVICES<br>% DEVICES                                                                                                                                                                                                                  |

ELECTROACOUSTIC TRANSDUCERS  
ELECTROACOUSTICS  
INTERDIGITAL TRANSDUCERS  
MICROSONICS  
SIGNAL PROCESSING  
SOUND WAVES  
ULTRASONIC WAVE TRANSDUCERS

SURFACE COOLING  
1803 3303 3501  
GS  
#SURFACE COOLING  
RT CONVECTIVE HEAT TRANSFER  
EVAPORATIVE COOLING  
FILM COOLING  
RADIANT COOLING  
RADIATIVE HEAT TRANSFER  
% SURFACES  
SWEAT COOLING  
TEMPERATURE

SURFACE CRACKS  
1504 1704 3201 3203 3204  
UF CRAZING  
GS FRACTURES (MATERIALS)  
. CRACKS  
. #SURFACE CRACKS  
SURFACE PROPERTIES  
#SURFACE CRACKS  
RT CRACK CLOSURE  
CRACK GEOMETRY  
CRACK INITIATION  
CRACK PROPAGATION  
MICROCRACKS  
SOLID SURFACES  
% SURFACES

SURFACE DEFECTS  
1702 1704 1805 3204  
GS DEFECTS  
#SURFACE DEFECTS  
SURFACE PROPERTIES  
#SURFACE DEFECTS  
RT CAUSTICS (OPTICS)  
CRACK INITIATION  
CRYSTAL DEFECTS  
CRYSTAL DISLOCATIONS  
FATIGUE (MATERIALS)  
MECHANICAL PROPERTIES  
POINT DEFECTS  
% SURFACES

SURFACE DIFFUSION  
0602 0603 1203 2311  
GS DIFFUSION

RT #SURFACE DIFFUSION  
MOLECULAR DIFFUSION  
% SURFACES  
THERMAL DIFFUSION

SURFACE DISTORTION  
0602 0710 2301 2310 2402  
GS DISTORTION  
#SURFACE DISTORTION  
RT %SURFACE GEOMETRY  
% SURFACES  
WARPAGE

SURFACE EFFECT SHIPS  
1204  
UF SES  
GS SURFACE VEHICLES  
#SURFACE EFFECT SHIPS  
WATER VEHICLES  
. SHIPS  
. #SURFACE EFFECT SHIPS  
RT CAPTURED AIR BUBBLE VEHICLES  
% EFFECTS  
RESEARCH VEHICLES  
% SURFACES  
SWATH (SHIP)  
% VEHICLES

SURFACE EMITTING LASERS  
1601  
GS STIMULATED EMISSION DEVICES  
. LASERS  
. #SURFACE EMITTING LASERS  
RT LASER ARRAYS  
LASING  
LIGHT EMITTING DIODES  
SEMICONDUCTOR LASERS  
SOLID STATE LASERS  
STIMULATED EMISSION  
WAVEGUIDE LASERS

SURFACE ENERGY  
0603 2306 2308 2311  
GS SURFACE PROPERTIES  
#SURFACE ENERGY  
THERMODYNAMIC PROPERTIES  
#SURFACE ENERGY  
RT ACTIVATION ENERGY  
ELECTRON ENERGY  
% ENERGY  
INTERFACIAL ENERGY  
INTERFACIAL TENSION  
PROTON ENERGY  
% SURFACES  
THERMOPHYSICAL PROPERTIES

SURFACE FINISHING  
0602 1504 1704 2601  
GS SURFACE TREATMENT  
#SURFACE FINISHING  
RT CLEANING  
COATING  
COATINGS  
CORROSION PREVENTION  
CORROSION RESISTANCE  
ELECTROPLATING  
ELECTROPOLISHING  
FINISHES  
MACHINING  
METAL FINISHING  
METAL GRINDING  
METAL POLISHING  
METAL SPRAYING  
METAL SURFACES  
MICROMACHINING  
POLISHING  
PROTECTIVE COATINGS  
SHOT PEENING  
SOLID SURFACES  
SPUTTERING  
% SURFACES  
WEAR

% SURFACE GEOMETRY  
0101 1902 3203  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT CONCAVITY  
CONVEXITY  
COSSERAT SURFACES  
FLAT SURFACES  
FLATNESS  
GEOMETRY  
LAMBERT SURFACE  
LOFTING  
PLANFORMS  
SHAPES  
SURFACE DISTORTION  
SURFACE LAYERS  
SURFACE PROPERTIES  
SURFACE REACTIONS  
SURFACE ROUGHNESS  
SURFACE STABILITY  
% SURFACES

SURFACE INTERACTIONS  
USE SURFACE REACTIONS

SURFACE IONIZATION

# NASA THESAURUS HIERARCHICAL UPDATE

|                                     |  |  |  |
|-------------------------------------|--|--|--|
| 0602 1804 2306                      |  |  |  |
| GS IONIZATION                       |  |  |  |
| #SURFACE IONIZATION                 |  |  |  |
| RT IONIZERS                         |  |  |  |
| % SURFACES                          |  |  |  |
| SURFACE LAYERS                      |  |  |  |
| 0603 1202 1203 1301 1302            |  |  |  |
| RT ATMOSPHERIC STRATIFICATION       |  |  |  |
| BARRIER LAYERS                      |  |  |  |
| BOUNDARY LAYERS                     |  |  |  |
| CRYSTAL SURFACES                    |  |  |  |
| % LAYERS                            |  |  |  |
| LUNAR SURFACE                       |  |  |  |
| MONOMOLECULAR FILMS                 |  |  |  |
| OXIDE FILMS                         |  |  |  |
| SOLAR GRANULATION                   |  |  |  |
| % SURFACE GEOMETRY                  |  |  |  |
| SURFACE TREATMENT                   |  |  |  |
| % SURFACES                          |  |  |  |
| THERMOCLINES                        |  |  |  |
| % TRANSITION LAYERS                 |  |  |  |
| SURFACE NAVIGATION                  |  |  |  |
| 2103                                |  |  |  |
| UF MARINE NAVIGATION                |  |  |  |
| GS NAVIGATION                       |  |  |  |
| #SURFACE NAVIGATION                 |  |  |  |
| RT CELESTIAL NAVIGATION             |  |  |  |
| DEAD RECKONING                      |  |  |  |
| DECCA NAVIGATION                    |  |  |  |
| DIGITAL NAVIGATION                  |  |  |  |
| HYPERBOLIC NAVIGATION               |  |  |  |
| INERTIAL NAVIGATION                 |  |  |  |
| LORAC NAVIGATION SYSTEM             |  |  |  |
| LORAN                               |  |  |  |
| NAUTICAL CHARTS                     |  |  |  |
| NAVIGATION AIDS                     |  |  |  |
| RADAR NAVIGATION                    |  |  |  |
| RADIO NAVIGATION                    |  |  |  |
| SHIPS                               |  |  |  |
| % SURFACES                          |  |  |  |
| SURFACE NOISE INTERACTIONS          |  |  |  |
| 2301                                |  |  |  |
| RT ACOUSTIC EXCITATION              |  |  |  |
| ACOUSTIC SCATTERING                 |  |  |  |
| AEROACOUSTICS                       |  |  |  |
| AERODYNAMIC NOISE                   |  |  |  |
| TURBULENCE                          |  |  |  |
| SURFACE PRESSURE                    |  |  |  |
| USE PRESSURE                        |  |  |  |
| SURFACE PROPERTIES                  |  |  |  |
| 0104 0601 0603 3201 3408            |  |  |  |
| UF BARDEEN APPROXIMATION            |  |  |  |
| GS #SURFACE PROPERTIES              |  |  |  |
| .ADHESION                           |  |  |  |
| .ADSORPTIVITY                       |  |  |  |
| .COEFFICIENT OF FRICTION            |  |  |  |
| .INTERFACIAL TENSION                |  |  |  |
| .SPECTRAL REFLECTANCE               |  |  |  |
| .SURFACE CRACKS                     |  |  |  |
| .SURFACE DEFECTS                    |  |  |  |
| .SURFACE ENERGY                     |  |  |  |
| .SURFACE ROUGHNESS                  |  |  |  |
| .SURFACE STABILITY                  |  |  |  |
| .SURFACE TEMPERATURE                |  |  |  |
| ..SKIN TEMPERATURE (NON-BIOLOGICAL) |  |  |  |
| ..WALL TEMPERATURE                  |  |  |  |
| RT ABSORPTANCE                      |  |  |  |
| ALBEDO                              |  |  |  |
| ATOMIC FORCE MICROSCOPY             |  |  |  |
| BIDIRECTIONAL REFLECTANCE           |  |  |  |
| COARSENESS                          |  |  |  |
| COATING                             |  |  |  |
| COATINGS                            |  |  |  |
| COLOR                               |  |  |  |
| CONTACT POTENTIALS                  |  |  |  |
| CONTACT RESISTANCE                  |  |  |  |
| CORROSION                           |  |  |  |
| COSSERAT SURFACES                   |  |  |  |
| DIFFUSION                           |  |  |  |
| EFFERVESCENCE                       |  |  |  |
| EMISSIVITY                          |  |  |  |
| EVANESCENCE                         |  |  |  |
| FINISHES                            |  |  |  |
| FLAT SURFACES                       |  |  |  |
| FOAMING                             |  |  |  |
| FRICTION                            |  |  |  |
| HARDNESS                            |  |  |  |
| HOT CORROSION                       |  |  |  |
| INTERFACES                          |  |  |  |
| JUPITER RED SPOT                    |  |  |  |
| LUNAR ALBEDO                        |  |  |  |
| LUNAR SURFACE                       |  |  |  |
| LUNAR TOPOGRAPHY                    |  |  |  |
| MECHANICAL PROPERTIES               |  |  |  |
| METAL SURFACES                      |  |  |  |
| OPTICAL PROPERTIES                  |  |  |  |
| PERMEABILITY                        |  |  |  |
| % PHYSICAL PROPERTIES               |  |  |  |
| PLANAR STRUCTURES                   |  |  |  |
| PLANETARY SURFACES                  |  |  |  |
| PROFILOMETERS                       |  |  |  |
| % PROPERTIES                        |  |  |  |
| REFLECTANCE                         |  |  |  |
| ROUGHNESS                           |  |  |  |
| SELENOGRAPHY                        |  |  |  |
| 0104 0603 1203 1309 3501            |  |  |  |
| UF SURFACE INTERACTIONS             |  |  |  |
| RT CHEMICAL REACTIONS               |  |  |  |
| EROSION                             |  |  |  |
| FLUID-SOLID INTERACTIONS            |  |  |  |
| GAS-LIQUID INTERACTIONS             |  |  |  |
| INTERFACES                          |  |  |  |
| METAL SURFACES                      |  |  |  |
| METAL-WATER REACTIONS               |  |  |  |
| SPACECRAFT GLOW                     |  |  |  |
| % SURFACE GEOMETRY                  |  |  |  |
| % SURFACES                          |  |  |  |
| SURFACTANTS                         |  |  |  |
| VAPORIZING                          |  |  |  |
| SURFACE ROUGHNESS                   |  |  |  |
| 0101 0104 1202 1704 3006 3203       |  |  |  |
| GS ROUGHNESS                        |  |  |  |
| #SURFACE ROUGHNESS                  |  |  |  |
| SURFACE PROPERTIES                  |  |  |  |
| #SURFACE ROUGHNESS                  |  |  |  |
| COARSENESS                          |  |  |  |
| RT FRICTION                         |  |  |  |
| LUNAR TOPOGRAPHY                    |  |  |  |
| MACHINING                           |  |  |  |
| MECHANICAL PROPERTIES               |  |  |  |
| PROFILOMETERS                       |  |  |  |
| RUNWAY CONDITIONS                   |  |  |  |
| % SURFACE GEOMETRY                  |  |  |  |
| % SURFACES                          |  |  |  |
| TOPOGRAPHY                          |  |  |  |
| SURFACE ROUGHNESS EFFECTS           |  |  |  |
| 0101 0104 2102 3203                 |  |  |  |
| RT % EFFECTS                        |  |  |  |
| FRICTION DRAG                       |  |  |  |
| REFLECTANCE                         |  |  |  |
| SEPARATED FLOW                      |  |  |  |
| SPECKLE PATTERNS                    |  |  |  |
| % SURFACES                          |  |  |  |
| SURFACE STABILITY                   |  |  |  |
| 1704 2602                           |  |  |  |

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

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# NASA THESAURUS HIERARCHICAL UPDATE

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.#SURVEYOR 1 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
...SURVEYOR LUNAR PROBES
...#SURVEYOR 1 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

SURVEYOR 2 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..SURVEYOR LUNAR PROBES
..#SURVEYOR 2 LUNAR PROBE
SOFT LANDING SPACECRAFT
.SURVEYOR LUNAR PROBES
.#SURVEYOR 2 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
...SURVEYOR LUNAR PROBES
...#SURVEYOR 2 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

SURVEYOR 3 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..SURVEYOR LUNAR PROBES
..#SURVEYOR 3 LUNAR PROBE
SOFT LANDING SPACECRAFT
.SURVEYOR LUNAR PROBES
.#SURVEYOR 3 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
...SURVEYOR LUNAR PROBES
...#SURVEYOR 3 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

SURVEYOR 4 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..SURVEYOR LUNAR PROBES
..#SURVEYOR 4 LUNAR PROBE
SOFT LANDING SPACECRAFT
.SURVEYOR LUNAR PROBES
.#SURVEYOR 4 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
...SURVEYOR LUNAR PROBES
...#SURVEYOR 4 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

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SURVEYOR 5 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..SURVEYOR LUNAR PROBES
..#SURVEYOR 5 LUNAR PROBE
SOFT LANDING SPACECRAFT
.SURVEYOR LUNAR PROBES
.#SURVEYOR 5 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
..#SURVEYOR LUNAR PROBES
...#SURVEYOR 5 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

SURVEYOR 6 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..SURVEYOR LUNAR PROBES
..#SURVEYOR 6 LUNAR PROBE
SOFT LANDING SPACECRAFT
.SURVEYOR LUNAR PROBES
.#SURVEYOR 6 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
..#SURVEYOR LUNAR PROBES
...#SURVEYOR 6 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

SURVEYOR 7 LUNAR PROBE
3004 3108
GS LUNAR SPACECRAFT
.LUNAR PROBES
..SURVEYOR LUNAR PROBES
..#SURVEYOR 7 LUNAR PROBE
SOFT LANDING SPACECRAFT
.SURVEYOR LUNAR PROBES
.#SURVEYOR 7 LUNAR PROBE
UNMANNED SPACECRAFT
.SPACER PROBES
..LUNAR PROBES
..#SURVEYOR LUNAR PROBES
...#SURVEYOR 7 LUNAR PROBE
RT ATLAS CENTAUR LAUNCH VEHICLE

SURVEYS
1905 3406
UF SURVEYING
GS #SURVEYS
.GEODETIC SURVEYS
.GEOLOGICAL SURVEYS

.SKY SURVEYS (ASTRONOMY)
.WAGE SURVEYS
ACCURACY
CONSTRUCTION
% CROSS SECTIONS
DATA ACQUISITION
DATA MANAGEMENT
DATUM (ELEVATION)
EXPLORATION
GENERAL OVERVIEWS
GEOMETRY
LAYOUTS
LORAN
MAPPING
MAPS
PHOTOGRAMMETRY
POSITION (LOCATION)
RECONNAISSANCE
SOIL MAPPING
% STATISTICS

SURVIVAL
0404 0507 0508 3104
RT AIRCRAFT SURVIVABILITY
CIVIL DEFENSE
CLOSED ECOLOGICAL SYSTEMS
DESERT ADAPTATION
KITS
LIFE SUPPORT SYSTEMS
LUNAR SHELTERS
SHELTERS
SPACECRAFT SURVIVABILITY

SURVIVAL EQUIPMENT
0404 0507 0508 3104
RT AEPS
AIRCRAFT SURVIVABILITY
CONSUMABLES (SPACECREW SUPPLIES)
EMERGENCY LIFE SUSTAINING SYSTEMS
% EQUIPMENT
LIFEBOATS
ONBOARD EQUIPMENT
OXYGEN SUPPLY EQUIPMENT
RAFTS

SUSCEPTIBILITY (MAGNETISM)
USE MAGNETIC PERMEABILITY

SUSPENDING (HANGING)
1403 1504 2308 3203
GS #SUSPENDING (HANGING)
.MAGNETIC SUSPENSION
RT GYROSCOPE FLUIDS
MOUNTING
SUSPENSION SYSTEMS (VEHICLES)

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## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

SWITZERLAND  
 1305  
 GS NATIONS  
 #SWITZERLAND  
 RT ALPS MOUNTAINS (EUROPE)  
 EUROPE  
 SWISS SPACE PROGRAM

SWIVELS  
 1502 1504  
 RT BEARINGS  
 GIMBALS  
 HINGES  
 HOOKS  
 JOINTS (JUNCTIONS)  
 PIVOTS

SYENITE  
 1305 1806  
 GS ROCKS  
 .IGNEOUS ROCKS  
 .#SYENITE  
 RT SOILS  
 TRACHYTE

SYLLABLES  
 0703  
 GS COMMUNICATION THEORY  
 .WORDS (LANGUAGE)  
 .#SYLLABLES  
 LANGUAGES

.SENTENCES  
 ..WORDS (LANGUAGE)  
 ...#SYLLABLES  
 LINGUISTICS  
 .SYNTAX  
 ..SENTENCES  
 ...WORDS (LANGUAGE)  
 ...#SYLLABLES  
 SIGNAL RECEPTION  
 #SYLLABLES  
 SPEECH  
 .TALKING  
 ..WORDS (LANGUAGE)  
 ...#SYLLABLES  
 RT MESSAGES  
 PSYCHOLINGUISTICS  
 SEMANTICS  
 SIGNAL TRANSMISSION

SYMBIOSIS  
 0404  
 RT ECOLOGY  
 LICHENS

SYMBIOTIC STARS  
 3001  
 GS CELESTIAL BODIES  
 .STARS  
 ..DOUBLE STARS  
 ...BINARY STARS  
 ...#SYMBIOTIC STARS  
 ..PECULIAR STARS  
 ..#SYMBIOTIC STARS  
 ..VARIABLE STARS  
 ...#SYMBIOTIC STARS  
 ..#SYMBIOTIC STARS  
 ABSORPTION SPECTRA  
 ECLIPSING BINARY STARS  
 EMISSION SPECTRA  
 FLARE STARS  
 M STARS  
 NOVAE  
 STELLAR ENVELOPES  
 STELLAR MASS ACCRETION  
 STELLAR OSCILLATIONS  
 STELLAR SPECTRA  
 STELLAR TEMPERATURE

SYMBOLIC PROGRAMMING  
 0802 0803  
 GS COMPUTER PROGRAMMING  
 #SYMBOLIC PROGRAMMING  
 RT CODING  
 COMPUTER ASSISTED INSTRUCTION  
 CONTEXT FREE LANGUAGES  
 LANGUAGE PROGRAMMING  
 MNEMONICS

SYMBOLS  
 0703 0802 0803 1201 1902  
 UF CHARACTERS  
 LETTERS (SYMBOLS)  
 SIGNS (SYMBOLS)  
 GS SIGNAL RECEPTION  
 #SYMBOLS  
 RT ALPHABETS  
 ALPHANUMERIC CHARACTERS  
 CHARACTER RECOGNITION  
 % CODES  
 CODING  
 COLOR  
 DATA PROCESSING  
 DIGITS  
 HIGH LEVEL LANGUAGES  
 LANGUAGES  
 LEGIBILITY  
 % MATHEMATICS  
 MESSAGE PROCESSING  
 MESSAGES  
 MNEMONICS

NOMENCLATURES  
 PERCEPTION  
 READING  
 SEMANTICS  
 UNITS OF MEASUREMENT  
 VISIBILITY

SYMMETRICAL BODIES  
 0102 0104 1202 3203  
 GS #SYMMETRICAL BODIES  
 .AXISMETRIC BODIES  
 .BODIES OF REVOLUTION  
 ..CONICAL BODIES  
 ...SLENDER CONES  
 ...CYLINDRICAL BODIES  
 ...ROTATING CYLINDERS  
 ..PARABOLIC BODIES  
 ..SPHERES  
 ...CELESTIAL SPHERE  
 ...CONCENTRIC SPHERES  
 ...FALLING SPHERES  
 ...POINCARÉ SPHERES  
 ...ROTATING SPHERES  
 ..TORUSES

.ELLIPSOIDS  
 .LENTICULAR BODIES  
 .STREAMLINED BODIES  
 ..FAIRINGS

RT AXES OF ROTATION  
 BLUNT BODIES  
 % BODIES  
 CONES

FINNED BODIES  
 FLARED BODIES  
 GEOIDS  
 OGIVES

SLENDER BODIES  
 SPINNING UNGUIDED ROCKET TRAJECTORY

SYMMETRY  
 1902 2311  
 UF AXISYMMETRY  
 GS #SYMMETRY

.BROKEN SYMMETRY  
 .SUPERSYMMETRY  
 RT ANTISYMMETRY  
 ASYMMETRY

CONGRUENCES  
 CONTINUITY (MATHEMATICS)  
 ECCENTRICITY  
 GEOMETRY  
 GRAND UNIFIED THEORY  
 ISOTROPISM  
 QUANTILES  
 SHAPES

[illegible]

[illegible]

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...EARLY BIRD SATELLITES
...SYNCOM 1 SATELLITE
...SYNCOM 2 SATELLITE
...SYNCOM 3 SATELLITE
...SYNCOM 4 SATELLITE
.COMMUNICATION SATELLITES
.#SYNCOM SATELLITES
...EARLY BIRD SATELLITES
...SYNCOM 1 SATELLITE
...SYNCOM 2 SATELLITE
...SYNCOM 3 SATELLITE
...SYNCOM 4 SATELLITE
.SYNCHRONOUS SATELLITES
.#SYNCOM SATELLITES
...EARLY BIRD SATELLITES
...SYNCOM 1 SATELLITE
...SYNCOM 2 SATELLITE
...SYNCOM 3 SATELLITE
...SYNCOM 4 SATELLITE
THOR DELTA LAUNCH VEHICLE

RT
SYNCOM 1 SATELLITE
0706 3107
GS ARTIFICIAL SATELLITES
.ACTIVE SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 1 SATELLITE
.COMMUNICATION SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 1 SATELLITE
.SYNCHRONOUS SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 1 SATELLITE
.DELTA LAUNCH VEHICLE

RT
SYNCOM 2 SATELLITE
0706 3107
GS ARTIFICIAL SATELLITES
.ACTIVE SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 2 SATELLITE
.COMMUNICATION SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 2 SATELLITE
.SYNCHRONOUS SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 2 SATELLITE
.DELTA LAUNCH VEHICLE

RT
SYNCOM 3 SATELLITE
0706 3107
GS ARTIFICIAL SATELLITES
.ACTIVE SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 3 SATELLITE
.COMMUNICATION SATELLITES
..SYNCOM SATELLITES

...#SYNCOM 3 SATELLITE
.SYNCHRONOUS SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 3 SATELLITE
.DELTA LAUNCH VEHICLE

RT
SYNCOM 4 SATELLITE
3107
GS ARTIFICIAL SATELLITES
.COMMUNICATION SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 4 SATELLITE

SYNCOPE
O401 O405 O408
UF FAINTING
GS #SYNCOPE
..BLACKOUT (PHYSIOLOGY)
..BLACKOUT PREVENTION
UNCONSCIOUSNESS

RT
SYNDROMES
USE SIGNS AND SYMPTOMS

SYNOPTIC MEASUREMENT
1406 1408 2001 2003 3405 3501
RT % MEASUREMENT
NEPHANALYSIS

SYNOPTIC METEOROLOGY
2001 2003
GS METEOROLOGY
#SYNOPTIC METEOROLOGY

RT
AIR MASSES
ANTICYCLONES
COLD FRONTS
CYCLONES
FRONTS (METEOROLOGY)
METEOROLOGICAL CHARTS
NEPHANALYSIS
TELECONNECTIONS (METEOROLOGY)
WARM FRONTS
WEATHER FORECASTING

SYNTAX
0703 3405
GS LINGUISTICS
#SYNTAX
...SENTENCES
...WORDS (LANGUAGE)
...SYLLABLES

RT
GRAMMARS
% INTERPRETATION
LANGUAGES

...#SYNCOM 3 SATELLITE
.SYNCHRONOUS SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 3 SATELLITE
.DELTA LAUNCH VEHICLE

RT
SYNCOM 4 SATELLITE
3107
GS ARTIFICIAL SATELLITES
.COMMUNICATION SATELLITES
..SYNCOM SATELLITES
..#SYNCOM 4 SATELLITE

SYNTECTIC ALLOYS
1701
GS ALLOYS
#SYNTECTIC ALLOYS
RT EUTECTICS
LIQUID PHASES
METALS
PHASE TRANSFORMATIONS
SOLID PHASES

SYNTHANE
O602 O603 1808
UF SYNTHETIC METHANE
GS FUELS
.CHEMICAL FUELS
..HYDROCARBON FUELS
..#SYNTHANE
..SYNTHETIC FUELS
..#SYNTHANE
AUTOMOBILE FUELS
CARBON DIOXIDE
CARBON MONOXIDE
COAL
COAL GASIFICATION
GASIFICATION
HYDROGEN
LIGNITE
METHANE

% SYNTHESIS
O601 1902 3406 3407
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT BIOSYNTHESIS
CHEMICAL REACTIONS
DECISION THEORY
% DESIGN
NETWORK SYNTHESIS
NUCLEAR FUSION
OPERATIONS RESEARCH
PLASMA JET SYNTHESIS
SYNTHESIS (CHEMISTRY)
SYNTHETIC FUELS
SYSTEMS ENGINEERING

SYNTHESIS (CHEMISTRY)
O601

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## NASA THESAURUS HIERARCHICAL UPDATE

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|                                                       |                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                    | ....MICARTA<br>....PHENOLIC EPOXY RESINS<br>POLYETHYLENES<br>POLYMERS<br>% POLYPROPYLENE<br>POLYSTYRENE<br>POLYTETRAFLUOROETHYLENE<br>POLYVINYL ALCOHOL<br>POLYVINYL CHLORIDE<br>SYNTHESIS (CHEMISTRY)<br>TEFLON (TRADEMARK)                                                                                                                              | #SYRINGES<br>MEDICAL EQUIPMENT<br>#SYRINGES<br>RT BULBS<br>% EQUIPMENT<br>FLUID FLOW<br>PIPES (TUBES)<br>TRANSFUSION                                                                                                                                                                                                                                                                                              | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ELECTRIC CURRENT<br>ELECTRIC PULSES<br>ELECTROMAGNETIC INTERFERENCE<br>ELECTRONIC EQUIPMENT<br>EXTERNAL SURFACE CURRENTS<br>EXTRATERRESTRIAL RADIATION<br>IONIZING RADIATION<br>PLASMA SHEATHS<br>SATELLITE COMMUNICATION<br>SPACECRAFT CHARGING<br>SPACECRAFT COMMUNICATION<br>X RAYS |
| SYNTHETIC RUBBERS<br>1808 1809 1810 3404<br>GS RUBBER | ..ADIPRENE (TRADEMARK)<br>..BUNA (TRADEMARK)<br>..ELASTOMERS<br>...CHLOROPRENE RESINS<br>...THIOPLASTICS<br>...VITON RUBBER (TRADEMARK)<br>...VULCANIZED ELASTOMERS<br>..RTV-40 RUBBER (TRADEMARK)<br>..RTV-60 RUBBER (TRADEMARK)<br>LATEX<br>POLYBUTADIENE<br>POLYISOBUTYLENE<br>POLYISOPRENES<br>SILICONE RUBBER<br>SOLITHANES<br>SYNTHESIS (CHEMISTRY) | SYSTEM EFFECTIVENESS<br>3406 3408 4001<br>GS EFFECTIVENESS<br>RT MODULATION TRANSFER FUNCTION<br>OPTICAL TRANSFER FUNCTION<br>RELIABILITY<br>RELIABILITY ENGINEERING<br>% SYSTEMS<br>SYSTEMS ENGINEERING<br>SYSTEMS INTEGRATION                                                                                                                                                                                   | SYSTEM IDENTIFICATION<br>1003 GS<br>ESTIMATING<br>#SYSTEM IDENTIFICATION<br>IDENTIFYING<br>#SYSTEM IDENTIFICATION<br>SYSTEMS ANALYSIS<br>#SYSTEM IDENTIFICATION<br>COMPLEX SYSTEMS<br>CONTROL SYSTEMS DESIGN<br>DYNAMIC RESPONSE<br>ESTIMATES<br>FUZZY SYSTEMS<br>MATHEMATICAL MODELS<br>MAXIMUM LIKELIHOOD ESTIMATES<br>OBSERVABILITY (SYSTEMS)<br>OPTIMIZATION<br>PARAMETER IDENTIFICATION<br>PARAMETERIZATION<br>PREDICTION ANALYSIS TECHNIQUES<br>PROBABILITY THEORY<br>RELIABILITY ENGINEERING<br>STATISTICAL ANALYSIS<br>STEEPEST DESCENT METHOD<br>% SYSTEMS<br>SYSTEMS ENGINEERING |                                                                                                                                                                                                                                                                                        |
| SYNTONY<br>3408<br>RT                                 | FREQUENCY SYNCHRONIZATION<br>OSCILLATIONS<br>RESONANCE                                                                                                                                                                                                                                                                                                    | SYSTEM FAILURES<br>0503 1002 3203<br>GS FAILURE<br>#SYSTEM FAILURES<br>RT % BREAKDOWN<br>DETERIORATION<br>DOWNTIME<br>FATIGUE (MATERIALS)<br>FAULT DETECTION<br>MALFUNCTIONS<br>SHORT CIRCUITS<br>STRUCTURAL FAILURE<br>STRUCTURAL STRAIN<br>% SYSTEMS<br>WEAR                                                                                                                                                    | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                        |
| SYPHILIS<br>0404 0405<br>GS DISEASES                  | .INFECTIOUS DISEASES<br>..BACTERIAL DISEASES<br>..#SYPHILIS                                                                                                                                                                                                                                                                                               | SYSTEM GENERATED ELECTROMAGNETIC PULSES<br>2304 UF<br>SGEMP<br>GS ELECTROMAGNETIC FIELDS<br>#SYSTEM GENERATED ELECTROMAGNETIC PULSES<br>ELECTROMAGNETIC RADIATION<br>ELECTROMAGNETIC PULSES<br>#SYSTEM GENERATED ELECTROMAGNETIC PULSES<br>PULSED RADIATION<br>ELECTROMAGNETIC PULSES<br>#SYSTEM GENERATED ELECTROMAGNETIC PULSES<br>PULSES<br>ELECTROMAGNETIC PULSES<br>#SYSTEM GENERATED ELECTROMAGNETIC PULSES | SYSTEM 10 COMPUTER<br>USE PDP 10 COMPUTER<br>% SYSTEMS<br>0503 1003 3203<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT ADVANCED VIDICON CAMERA SYSTEM<br>(AVCS)<br>AEROSPACE SYSTEMS<br>AFFERENT NERVOUS SYSTEMS<br>AFRICAN RIFT SYSTEM<br>AIR CUSHION LANDING SYSTEMS<br>AIRBORNE INTEGRATED RECONNAISSANCE                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                        |
| SYRIA<br>1305<br>GS NATIONS                           | #SYRIA<br>RT ASIA                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                        |
| SYRINGES<br>0405 0501 1106<br>GS LABORATORY EQUIPMENT |                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                        |

# NASA THESAURUS HIERARCHICAL UPDATE

SYSTEM  
 AIRCRAFT FUEL SYSTEMS  
 AIRCRAFT HYDRAULIC SYSTEMS  
 ALL-WEATHER LANDING SYSTEMS  
 ALOHA SYSTEM  
 ANNULAR SUSPENSION AND POINTING SYSTEM  
 APOLLO EXTENSION SYSTEM  
 ASCENT PROPULSION SYSTEMS  
 ASTROGUIDE NAVIGATION SYSTEM  
 ATMOSPHERIC & OCEANOGRAPHIC INFORM SYS  
 AUTOMATED PILOT ADVISORY SYSTEM  
 AUTOMATED RADAR TERMINAL SYSTEM  
 AUTOMATIC TRAFFIC ADVISORY AND RESOLUTION  
 AUTONOMIC NERVOUS SYSTEM  
 BALLISTIC MISSILE EARLY WARNING SYSTEM  
 BEACON COLLISION AVOIDANCE SYSTEM  
 BINARY SYSTEMS (MATERIALS)  
 BIODASTRONAUTICAL ORBITAL SPACE SYSTEM  
 BIOCONTROL SYSTEMS  
 CARDIOVASCULAR SYSTEM  
 CELESTIAL REFERENCE SYSTEMS  
 CENTRAL ELECTRONIC MANAGEMENT SYSTEM  
 CENTRAL NERVOUS SYSTEM  
 CENTRAL NERVOUS SYSTEM DEPRESSANTS  
 CENTRAL NERVOUS SYSTEM STIMULANTS  
 CHOKES (FUEL SYSTEMS)  
 CLOSED ECOLOGICAL SYSTEMS  
 COMPLEX SYSTEMS  
 COMPUTER SYSTEMS DESIGN  
 COMPUTER SYSTEMS PERFORMANCE  
 COMPUTER SYSTEMS PROGRAMS  
 COMPUTER SYSTEMS SIMULATION  
 COOLING SYSTEMS  
 CYBERNETICS  
 DATA BASE MANAGEMENT SYSTEMS  
 DATA SYSTEMS  
 DEFENSE COMMUNICATIONS SATELLITE SYSTEM  
 DEFENSE COMMUNICATIONS SYSTEM (DCS)  
 DESCENT PROPULSION SYSTEMS  
 DIGESTIVE SYSTEM  
 DIGITAL COMMAND SYSTEMS  
 DIGITAL SYSTEMS  
 DISCRETE ADDRESS BEACON SYSTEM  
 DISK OPERATING SYSTEM (DOS)  
 DISPLAY DEVICES  
 DISTRIBUTED PARAMETER SYSTEMS  
 DOMESTIC SATELLITE COMMUNICATIONS SYSTEMS

EARLY WARNING SYSTEMS  
 EARTH RESOURCES INFORMATION SYSTEM  
 EARTH TERMINAL MEASUREMENT SYSTEM  
 EARTH-MOON SYSTEM  
 ECOSYSTEMS  
 EFFERENT NERVOUS SYSTEMS  
 ELSCAT RADAR SYSTEM (EUROPE)  
 % ELASTIC SYSTEMS  
 ELECTRONIC RECORDING SYSTEMS  
 EMERGENCY LIFE SUSTAINING SYSTEMS  
 END-TO-END DATA SYSTEMS  
 ENDOCRINE SYSTEMS  
 ESCAPE SYSTEMS  
 EXHAUST SYSTEMS  
 FAIL-SAFE SYSTEMS  
 FEED SYSTEMS  
 FEEDBACK  
 FLEET SATELLITE COMMUNICATION SYSTEM  
 FUEL SYSTEMS  
 FUZZY SYSTEMS  
 GASTROINTESTINAL SYSTEM  
 GENITOURINARY SYSTEM  
 GLOBAL POSITIONING SYSTEM  
 GODDARD TRAJECTORY DETERMINATION SYSTEM  
 GROUND OPERATIONAL SUPPORT SYSTEM  
 GROUND SUPPORT SYSTEMS  
 GUIDANCE (MOTION)  
 HARDENING (SYSTEMS)  
 HEMATOPOIETIC SYSTEM  
 HYBRID NAVIGATION SYSTEMS  
 HYDRAULIC EQUIPMENT  
 HYDROPLANES (SURFACES)  
 HYDROTHERMAL SYSTEMS  
 % HYPERBOLIC SYSTEMS  
 IFF SYSTEMS (IDENTIFICATION)  
 IGNITION SYSTEMS  
 IMLSS  
 INERTIAL REFERENCE SYSTEMS  
 INFORMATION ADAPTIVE SYSTEM  
 INFORMATION SYSTEMS  
 INSTRUMENT LANDING SYSTEMS  
 INTAKE SYSTEMS  
 INTEGRATED ENERGY SYSTEMS  
 INTEGRATED GLOBAL OCEAN STATION SYSTEMS  
 INTERNATIONAL SYSTEM OF UNITS  
 INTRAVASCULAR SYSTEM  
 JETTISON SYSTEMS  
 LAUNCH ESCAPE SYSTEMS  
 LIFE SUPPORT SYSTEMS  
 LIGHT AIRBORNE MULTIPURPOSE SYSTEM  
 LINEAR SYSTEMS  
 LOCATES SYSTEM

LORAC NAVIGATION SYSTEM  
 LUBRICATION SYSTEMS  
 LUMPED PARAMETER SYSTEMS  
 LUNAR EXPLORATION SYSTEM FOR APOLLO  
 MAN MACHINE SYSTEMS  
 MAN OPERATED PROPULSION SYSTEMS  
 MANAGEMENT INFORMATION SYSTEMS  
 MANAGEMENT SYSTEMS  
 METAL-GAS SYSTEMS  
 METHOXY SYSTEMS  
 MICROWAVE LANDING SYSTEMS  
 MICROWAVE SCANNING BEAM LANDING SYSTEM  
 MIMO (CONTROL SYSTEMS)  
 MINITRACK SYSTEM  
 MIROS SYSTEM  
 MISSILE SYSTEMS  
 MODULAR INTEGRATED UTILITY SYSTEM  
 MUSCULOSKELETAL SYSTEM  
 NASA INTERACTIVE PLANNING SYSTEM  
 NATIONAL AIRSPACE UTILIZATION SYSTEM  
 NATIONAL AVIATION SYSTEM  
 NATIONAL OCEANIC SATELLITE SYSTEM  
 NAVIGATION  
 NEEDS (DATA SYSTEM)  
 NERVOUS SYSTEM  
 NIKE X SYSTEMS  
 NOESS  
 NONLINEAR SYSTEMS  
 NOVA LASER SYSTEM  
 OBSERVABILITY (SYSTEMS)  
 OMEGA NAVIGATION SYSTEM  
 ON-LINE SYSTEMS  
 OPERATING SYSTEMS (COMPUTERS)  
 OPTICAL RELAY SYSTEMS  
 PAYLOAD DEPLOYMENT & RETRIEVAL SYSTEM  
 PERIPHERAL NERVOUS SYSTEM  
 PHASE LOCKED SYSTEMS  
 PIGGYBACK SYSTEMS  
 PLANETARY SYSTEMS  
 PLAT SYSTEM  
 PNEUMATIC EQUIPMENT  
 POINTING CONTROL SYSTEMS  
 POLYSTATION DOPPLER TRACKING SYSTEM  
 PORTABLE LIFE SUPPORT SYSTEMS  
 POST BOOST PROPULSION SYSTEM  
 PROPULSION SYSTEM CONFIGURATIONS  
 PROPULSION SYSTEM PERFORMANCE  
 PUBLIC ADDRESS SYSTEMS  
 QUALITY CONTROL  
 RADIO RELAY SYSTEMS  
 RANGER BLOCK 3 TELEVISION SYSTEM  
 RAPID TRANSIT SYSTEMS

| RT                                  | % | ANALYZING | DATA PROCESSING |
|-------------------------------------|---|-----------|-----------------|
| REFERENCE SYSTEMS                   |   |           |                 |
| REMOTE MANIPULATOR SYSTEM           |   |           |                 |
| REPRODUCTIVE SYSTEMS                |   |           |                 |
| RESPIRATORY SYSTEM                  |   |           |                 |
| ROTOR SYSTEMS RESEARCH AIRCRAFT     |   |           |                 |
| SAFEGUARD SYSTEM                    |   |           |                 |
| SAGE AIR DEFENSE SYSTEM             |   |           |                 |
| SATELLITE NAVIGATION SYSTEMS        |   |           |                 |
| SELF ADAPTIVE CONTROL SYSTEMS       |   |           |                 |
| SELF ORGANIZING SYSTEMS             |   |           |                 |
| SENTINEL SYSTEM                     |   |           |                 |
| SHIVA LASER SYSTEM                  |   |           |                 |
| SISO (CONTROL SYSTEMS)              |   |           |                 |
| SNAP                                |   |           |                 |
| SOLAR SYSTEM                        |   |           |                 |
| SOLAR TOTAL ENERGY SYSTEMS          |   |           |                 |
| SPACE DETECTION AND TRACKING SYSTEM |   |           |                 |
| SPACE TRANSPORTATION SYSTEM         |   |           |                 |
| SPACE TRANSPORTATION SYSTEM FLIGHTS |   |           |                 |
| SUPPORT SYSTEMS                     |   |           |                 |
| SUSPENSION SYSTEMS (VEHICLES)       |   |           |                 |
| SYMPATHETIC NERVOUS SYSTEM          |   |           |                 |
| SYSTEM EFFECTIVENESS                |   |           |                 |
| SYSTEM FAILURES                     |   |           |                 |
| SYSTEM IDENTIFICATION               |   |           |                 |
| SYSTEMS ANALYSIS                    |   |           |                 |
| SYSTEMS ENGINEERING                 |   |           |                 |
| SYSTEMS INTEGRATION                 |   |           |                 |
| SYSTEMS MANAGEMENT                  |   |           |                 |
| SYSTEMS SIMULATION                  |   |           |                 |
| SYSTEMS STABILITY                   |   |           |                 |
| TELECOMMUNICATION                   |   |           |                 |
| TELEGRAPH SYSTEMS                   |   |           |                 |
| TELETYPEWRITER SYSTEMS              |   |           |                 |
| TELEVISION SYSTEMS                  |   |           |                 |
| TERCOM                              |   |           |                 |
| TERNARY SYSTEMS                     |   |           |                 |
| TIROS OPERATIONAL SATELLITE SYSTEM  |   |           |                 |
| TOTAL ENERGY SYSTEMS                |   |           |                 |
| TRADEX RADAR SYSTEM                 |   |           |                 |
| TRANSCONTINENTAL SYSTEMS            |   |           |                 |
| TRANSFER FUNCTIONS                  |   |           |                 |
| TRANSOCEANIC SYSTEMS                |   |           |                 |
| TYPHON WEAPON SYSTEM                |   |           |                 |
| VACUUM SYSTEMS                      |   |           |                 |
| VARIABLE MASS SYSTEMS               |   |           |                 |
| VORTEX ADVISORY SYSTEM              |   |           |                 |
| WARNING SYSTEMS                     |   |           |                 |
| WEAPON SYSTEM MANAGEMENT            |   |           |                 |
| WEAPON SYSTEMS                      |   |           |                 |
| SYSTEMS ANALYSIS                    |   |           |                 |
| 1905 3404 3405                      |   |           |                 |
| GS #SYSTEMS ANALYSIS                |   |           |                 |
| .SYSTEM IDENTIFICATION              |   |           |                 |
| ANALYZING                           |   |           |                 |
| BLOCK DIAGRAMS                      |   |           |                 |
| BOND GRAPHS                         |   |           |                 |
| COMPLEX SYSTEMS                     |   |           |                 |
| COMPUTER PROGRAMMING                |   |           |                 |
| COMPUTER SYSTEMS PROGRAMS           |   |           |                 |
| CONTROL SYSTEMS DESIGN              |   |           |                 |
| FEASIBILITY ANALYSIS                |   |           |                 |
| FUZZY SYSTEMS                       |   |           |                 |
| MAN MACHINE SYSTEMS                 |   |           |                 |
| MATHEMATICAL MODELS                 |   |           |                 |
| MODULATION TRANSFER FUNCTION        |   |           |                 |
| OBSERVABILITY (SYSTEMS)             |   |           |                 |
| OPERATING COSTS                     |   |           |                 |
| OPERATIONS RESEARCH                 |   |           |                 |
| OPTICAL TRANSFER FUNCTION           |   |           |                 |
| PARAMETER IDENTIFICATION            |   |           |                 |
| PREFLIGHT ANALYSIS                  |   |           |                 |
| PROCEDURES                          |   |           |                 |
| PROGRAM VERIFICATION (COMPUTERS)    |   |           |                 |
| SIMULATION                          |   |           |                 |
| SOCIOLOGY                           |   |           |                 |
| STATISTICAL ANALYSIS                |   |           |                 |
| SYSTEMS                             |   |           |                 |
| TRAJECTORY ANALYSIS                 |   |           |                 |
| WEIGHT ANALYSIS                     |   |           |                 |
| WEIGHT REDUCTION                    |   |           |                 |
| SYSTEMS COMPATIBILITY               |   |           |                 |
| 3408                                |   |           |                 |
| GS COMPATIBILITY                    |   |           |                 |
| #SYSTEMS COMPATIBILITY              |   |           |                 |
| RT RELIABILITY                      |   |           |                 |
| RELIABILITY ENGINEERING             |   |           |                 |
| SYSTEMS DESIGN                      |   |           |                 |
| USE SYSTEMS ENGINEERING             |   |           |                 |
| SYSTEMS ENGINEERING                 |   |           |                 |
| 0503 0506 4001                      |   |           |                 |
| UF SYSTEMS DESIGN                   |   |           |                 |
| GS #SYSTEMS ENGINEERING             |   |           |                 |
| .COMPUTER SYSTEMS DESIGN            |   |           |                 |
| .CONTROL SYSTEMS DESIGN             |   |           |                 |
| RT AEROSPACE SYSTEMS                |   |           |                 |
| AIRCRAFT DESIGN                     |   |           |                 |
| % AUTOMATION                        |   |           |                 |
| BIONICS                             |   |           |                 |
| BOND GRAPHS                         |   |           |                 |
| COMMUNICATING                       |   |           |                 |
| CONTRACT MANAGEMENT                 |   |           |                 |
| % CONTROL                           |   |           |                 |
| CRITICAL PATH METHOD                |   |           |                 |
| CYBERNETICS                         |   |           |                 |
| DATA PROCESSING                     |   |           |                 |
| DECISION MAKING                     |   |           |                 |
| DECISION THEORY                     |   |           |                 |
| % DESIGN                            |   |           |                 |
| ELECTRICAL ENGINEERING              |   |           |                 |
| % ENGINEERING                       |   |           |                 |
| EXPERIMENT DESIGN                   |   |           |                 |
| FLIGHT MANAGEMENT SYSTEMS           |   |           |                 |
| FORECASTING                         |   |           |                 |
| FUNCTIONAL DESIGN SPECIFICATIONS    |   |           |                 |
| HUMAN FACTORS ENGINEERING           |   |           |                 |
| INFORMATION THEORY                  |   |           |                 |
| LIFE CYCLE COSTS                    |   |           |                 |
| MAN MACHINE SYSTEMS                 |   |           |                 |
| MANAGEMENT                          |   |           |                 |
| MANAGEMENT PLANNING                 |   |           |                 |
| MATHEMATICAL MODELS                 |   |           |                 |
| MECHANIZATION                       |   |           |                 |
| MISSILE DESIGN                      |   |           |                 |

# NASA THESAURUS HIERARCHICAL UPDATE

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

T-64 ENGINE  
1203 1504 2801 2805  
GS ENGINES  
..AIR BREATHING ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....TURBOJET ENGINES  
....TURBOPROP ENGINES  
.....#T-64 ENGINE  
..INTERNAL COMBUSTION ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....TURBOJET ENGINES  
....TURBOPROP ENGINES  
.....#T-64 ENGINE  
RT HELICOPTER ENGINES

T-74 ENGINE  
2801 2805  
GS ENGINES  
..AIR BREATHING ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....TURBOJET ENGINES  
....TURBOPROP ENGINES  
.....#T-74 ENGINE  
..INTERNAL COMBUSTION ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....TURBOJET ENGINES  
....TURBOPROP ENGINES  
.....#T-74 ENGINE  
RT HELICOPTER ENGINES

T-76 ENGINE  
0202 2801 2805  
GS AIRCRAFT ENGINES  
#T-76 ENGINE  
ENGINES  
..INTERNAL COMBUSTION ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES

...#T-76 ENGINE  
..TURBINE ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....#T-76 ENGINE  
RT HELICOPTER ENGINES  
  
T-78 ENGINE  
2805  
GS AIRCRAFT ENGINES  
#T-78 ENGINE  
ENGINES  
..INTERNAL COMBUSTION ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....TURBOJET ENGINES  
....TURBOPROP ENGINES  
.....#T-78 ENGINE  
..TURBINE ENGINES  
..GAS TURBINE ENGINES  
..JET ENGINES  
....TURBOJET ENGINES  
....TURBOPROP ENGINES  
.....#T-78 ENGINE

TABLES (DATA)  
0506 0802 1103 1504 1902 1903  
GS #TABLES (DATA)  
..CONVERSION TABLES  
..INTERFERENCE FACTOR TABLE  
..MATHEMATICAL TABLES  
RT AIR DATA SYSTEMS  
ASTRONOMICAL CATALOGS  
% DATA  
DATA ACQUISITION  
DATA MANAGEMENT  
DATA PROCESSING  
DATA RECORDING  
DATA REDUCTION  
DATA RETRIEVAL  
PRINTOUTS  
STATISTICAL ANALYSIS  
% STATISTICS  
% TABULATION  
TABULATION PROCESSES

TABLETS  
1504  
RT BRIQUETS  
% CAPSULES  
MOLDS  
  
TABS (CONTROL SURFACES)  
0101 0102 0104 0202  
GS AIRFOILS

#TABS (CONTROL SURFACES)  
CONTROL SURFACES  
#TABS (CONTROL SURFACES)  
RT AERIAL RUDDERS  
AILERONS  
% CONTROL  
ELEVATORS (CONTROL SURFACES)  
ELEVONS  
RUDDERS  
STABILIZERS (FLUID DYNAMICS)  
% SURFACES  
  
TABULATING  
USE TABULATION PROCESSES  
  
% TABULATION  
1902 1905  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT TABLES (DATA)  
TABULATION PROCESSES

TABULATION PROCESSES  
0803 1902 1905  
UF TABULATING  
RT DATA PROCESSING  
DATA RECORDING  
TABLES (DATA)  
% TABULATION

TACAN 2103 3401  
2101 TACTICAL AIR NAVIGATION  
UF NAVIGATION  
GS .RADIO NAVIGATION  
.#TACAN  
RT AIR NAVIGATION  
ALL-WEATHER AIR NAVIGATION  
FLIGHT PATHS  
NAVIGATION AIDS  
RADAR NAVIGATION  
SOLAR COMPASSES

TACHISTOSCOPES  
0501 1406 2310 3501  
RT VISUAL PERCEPTION

TACHOMETERS  
1402 1406 1504 3501  
GS DISPLAY DEVICES  
..SPEED INDICATORS  
..#TACHOMETERS  
MEASURING INSTRUMENTS  
..INDICATING INSTRUMENTS

RT ..SPEED INDICATORS  
..#TACHOMETERS  
AIRCRAFT INSTRUMENTS  
ANGULAR VELOCITY  
TIMING DEVICES  
VELOCITY MEASUREMENT

TACHYCARDIA  
O401 0405 0408  
GS DISEASES  
#TACHYCARDIA  
RATES (PER TIME)  
.HEART RATE  
.#TACHYCARDIA

TACHYONS  
2403 2405  
GS PARTICLES  
.ELEMENTARY PARTICLES  
.#TACHYONS

TACHYPNEA  
O401 0405 0408  
GS RATES (PER TIME)  
.RESPIRATORY RATE  
.#TACHYPNEA

TACKINESS  
O603 3408  
RT ADHESION

TACT PROGRAM  
O201 0204 3409  
UF TRANSONIC AIRCRAFT TECHNOLOGY  
PROGRAM  
GS PROGRAMS  
.NASA PROGRAMS  
.#TACT PROGRAM  
RT % AERONAUTICS  
% AIRCRAFT

TACTICAL AIR NAVIGATION  
USE TACAN

TACTICS  
3401  
RT ATTACKING (ASSAULTING)  
DEPLOYMENT  
EVASIVE ACTIONS  
MILITARY OPERATIONS  
MILITARY TECHNOLOGY  
OBSTACLE AVOIDANCE

TACTILE DISCRIMINATION  
O404 0408

GS DISCRIMINATION  
.SENSORY DISCRIMINATION  
.#TACTILE DISCRIMINATION  
PERCEPTION  
.SENSORY PERCEPTION  
..TOUCH  
..#TACTILE DISCRIMINATION  
RT TACTILE SENSORS (ROBOTICS)

TACTILE SENSATION  
USE TOUCH

TACTILE SENSORS (ROBOTICS)  
1408 1409  
GS ROBOT SENSORS  
.#TACTILE SENSORS (ROBOTICS)  
RT END EFFECTORS  
MANIPULATORS  
ROBOTS  
% SENSORS  
SERVOMECHANISMS  
TACTILE DISCRIMINATION  
TELEOPERATORS  
TOUCH

TAFEL LAW  
O902 1001 1002 2304  
GS LAWS  
#TAFEL LAW  
RT ELECTRODES  
ELECTROLYSIS  
FICKS EQUATION  
POLARIZATION (CHARGE SEPARATION)

TAGGING  
USE MARKING

TAGN  
2701  
UF TRIAMINOQUANIDINENITRATE  
OXIDIZERS  
GS .ROCKET OXIDIZERS  
.#TAGN  
PROPELLANTS  
.ROCKET PROPELLANTS  
.#TAGN  
RT EXPLOSIVES

TAIL ASSEMBLIES  
O102 0104 0201  
UF EMPENNAGE  
TAIL MOUNTINGS  
TAILS (ASSEMBLIES)  
VERTICAL TAILS  
ASSEMBLIES  
GS

RT #TAIL ASSEMBLIES  
AERIAL RUDDERS  
AFTERBODIES  
AIRCRAFT PARTS  
AIRCRAFT STRUCTURES  
AIRFOILS  
AIRFRAMES  
BOATTAILS  
BODY-WING AND TAIL CONFIGURATIONS  
% BOOM  
CONTROL SURFACES  
ELEVATORS (CONTROL SURFACES)  
FINS  
HORIZONTAL TAIL SURFACES  
HYDROFOILS  
MARINE RUDDERS  
MISSILE STRUCTURES  
RUDDERS  
SAILS  
STABILIZERS (FLUID DYNAMICS)  
T TAIL SURFACES  
VANES

TAIL MOUNTINGS  
USE TAIL ASSEMBLIES

TAIL PLANES  
USE HORIZONTAL TAIL SURFACES

TAIL ROTORS  
O104 0201 0202  
GS ROTATING BODIES  
.ROTORS  
.#TAIL ROTORS  
...HELICOPTER TAIL ROTORS  
RT HELICOPTER CONTROL  
ROTARY WINGS  
% ROTOR BLADES

TAIL SURFACES  
O101 0102 0104 0202  
GS #TAIL SURFACES  
.HORIZONTAL TAIL SURFACES  
.SWEEPBACK TAIL SURFACES  
.T TAIL SURFACES  
.TRAPEZOIDAL TAIL SURFACES  
RT CONTROL SURFACES  
ELEVATORS (CONTROL SURFACES)  
RUDDERS  
STABILIZERS (FLUID DYNAMICS)  
% SURFACES

TAILLESS AIRCRAFT  
O201 0205



# NASA THESAURUS HIERARCHICAL UPDATE

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|                                               |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                            | LIQUID SLOSHING<br>PROPELLANT TANKS<br>STORAGE TANKS<br>TANKS (CONTAINERS)<br>ULLAGE                                                                                                                                                 | OFFSHORE PLATFORMS<br>SHIP TERMINALS<br>% TANKERS<br>TERMINAL FACILITIES<br>TRANSPORTATION                                                                                                                                                                                                                                                                                                                                                                          | TANK GEOMETRY<br>TOWERS<br>WING-FUSELAGE STORES                                                                                                                                                                                                                                                                                                       |
| TANK TRUCKS<br>1103<br>GS                     | TANK TRUCKS<br>SURFACE VEHICLES<br>. MOTOR VEHICLES<br>.. TRUCKS<br>.. #TANK TRUCKS<br>% TANKERS<br>TRAILERS                                                                                                                         | % TANKERS<br>1102 3401<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT<br>ARTIFICIAL HARBORS<br>DEEPWATER TERMINALS<br>OFFSHORE DOCKING<br>OFFSHORE PLATFORMS<br>TANK TRUCKS<br>TANKER AIRCRAFT<br>TANKER SHIPS<br>TANKER TERMINALS<br>TRANSPORTATION ENERGY                                                                                                                                                         | TANTALUM<br>1703<br>GS<br>CHEMICAL ELEMENTS<br>#TANTALUM<br>..TANTALUM ISOTOPES<br>METALS<br>. REFRACTORY METALS<br>..#TANTALUM<br>..TANTALUM ISOTOPES<br>.TRANSITION METALS<br>#TANTALUM<br>..TANTALUM ISOTOPES<br>REFRACTORY MATERIALS<br>. REFRACTORY METALS<br>#TANTALUM<br>...TANTALUM ISOTOPES                                                  |
| TANKER AIRCRAFT<br>0207<br>GS                 | TRANSPORT AIRCRAFT<br>#TANKER AIRCRAFT<br>RT AIR TO AIR REFUELING<br>% AIRCRAFT<br>AIRCRAFT FUELS<br>BOMBER AIRCRAFT<br>FUEL TANKS<br>% MILITARY AIRCRAFT<br>% TANKERS<br>VALIANT AIRCRAFT                                           | TANKS (COMBAT VEHICLES)<br>1801<br>GS<br>SURFACE VEHICLES<br>#TANKS (COMBAT VEHICLES)<br>RT<br>ARMED FORCES<br>% MILITARY OPERATIONS<br>MILITARY VEHICLES<br>ORDNANCE<br>% VEHICLES<br>WEAPONS                                                                                                                                                                                                                                                                      | TANTALUM ALLOYS<br>1701 1704 3305<br>GS<br>ALLOYS<br>. HEAT RESISTANT ALLOYS<br>..REFRACTORY METAL ALLOYS<br>..#TANTALUM ALLOYS<br>REFRACTORY MATERIALS<br>.REFRACTORY METAL ALLOYS<br>#TANTALUM ALLOYS<br>RT HAFNIUM ALLOYS                                                                                                                          |
| TANKER SHIPS<br>1103 1204<br>GS               | TANKER SHIPS<br>SURFACE VEHICLES<br>. CARGO SHIPS<br>..#TANKER SHIPS<br>ARTIFICIAL HARBORS<br>DEEPWATER TERMINALS<br>HARBORS<br>MARINE TRANSPORTATION<br>OFFSHORE DOCKING<br>OFFSHORE PLATFORMS<br>SHIPYARDS<br>% TANKERS<br>WHARVES | TANKS (CONTAINERS)<br>1103 1502<br>GS<br>#TANKS (CONTAINERS)<br>. BUNKERS (FUEL)<br>. CYLINDRICAL TANKS<br>. EXTERNAL TANKS<br>. FUEL TANKS<br>.. WING TANKS<br>. PROPELLANT TANKS<br>. SPHERICAL TANKS<br>. STORAGE TANKS<br>RT<br>BASINS (CONTAINERS)<br>BOTTLES<br>CHEMICAL REACTORS<br>% CONTAINERS<br>DRUMS (CONTAINERS)<br>FLUID FILLED SHELLS<br>LIQUID FILLED SHELLS<br>MATERIALS HANDLING<br>PIPE NOZZLES<br>PRESSURE VESSELS<br>RECEIVERS<br>% STRUCTURES | TANTALUM CARBIDES<br>0603 1804<br>GS<br>CARBON COMPOUNDS<br>. CARBIDES<br>..#TANTALUM CARBIDES<br>TANTALUM COMPOUNDS<br>#TANTALUM CARBIDES<br>TANTALUM COMPOUNDS<br>0603 1804<br>GS<br>#TANTALUM COMPOUNDS<br>. TANTALUM CARBIDES<br>. TANTALUM NITRIDES<br>. TANTALUM OXIDES<br>RT % CHEMICAL COMPOUNDS<br>% GROUP 5B COMPOUNDS<br>% METAL COMPOUNDS |
| TANKER TERMINALS<br>1102 1305 1310 3404<br>RT | TERMINALS<br>1305 1310 3404<br>RT<br>ARTIFICIAL HARBORS<br>CARGO SHIPS<br>DEEPWATER TERMINALS<br>MARINE TECHNOLOGY<br>OCEANOGRAPHY<br>OFFSHORE DOCKING                                                                               | TANTALUM ISOTOPES<br>1703 2406<br>GS<br>CHEMICAL ELEMENTS<br>.NUCLIDES<br>.. ISOTOPES                                                                                                                                                                                                                                                                                                                                                                               | TANTALUM ISOTOPES<br>1703<br>GS<br>CHEMICAL ELEMENTS<br>#TANTALUM<br>..TANTALUM ISOTOPES<br>METALS<br>. REFRACTORY METALS<br>..#TANTALUM<br>..TANTALUM ISOTOPES<br>.TRANSITION METALS<br>#TANTALUM<br>..TANTALUM ISOTOPES<br>REFRACTORY MATERIALS<br>. REFRACTORY METALS<br>#TANTALUM<br>...TANTALUM ISOTOPES                                         |

# NASA THESAURUS HIERARCHICAL UPDATE

..#TANTALUM ISOTOPEs  
 .TANTALUM  
 .#TANTALUM ISOTOPEs  
 METALS  
 .REFRACTORY METALS  
 ..TANTALUM  
 ..#TANTALUM ISOTOPEs  
 .TRANSITION METALS  
 ..TANTALUM  
 ..#TANTALUM ISOTOPEs  
 .REFRACTORY MATERIALS  
 .REFRACTORY METALS  
 ..TANTALUM  
 ..#TANTALUM ISOTOPEs

TANTALUM NITRIDES  
 O603 1804  
 GS  
 NITROGEN COMPOUNDS  
 .NITRIDES  
 ..METAL NITRIDES  
 ..#TANTALUM NITRIDES  
 TANTALUM COMPOUNDS  
 #TANTALUM NITRIDES

TANTALUM OXIDES  
 O603 1804  
 GS  
 CHALCOGENIDES  
 .OXIDES  
 ..METAL OXIDES  
 ..#TANTALUM OXIDES  
 TANTALUM COMPOUNDS  
 #TANTALUM OXIDES

TANZANIA  
 1305  
 GS  
 NATIONS  
 #TANZANIA  
 RT  
 AFRICA

TAPE RECORDERS  
 O702 O905 2301 3405 9001  
 UF  
 MAGNETIC TAPE RECORDERS  
 GS  
 RECORDING INSTRUMENTS  
 #TAPE RECORDERS  
 ..VIDEO TAPE RECORDERS  
 RT  
 DATA RECORDERS  
 ELECTRONIC RECORDING SYSTEMS  
 MAGNETIC TAPE TRANSPORTS  
 MAGNETIC TAPES  
 % RECORDERS  
 RECORDING HEADS  
 RECORDING INSTRUMENTS

TAPER  
 USE  
 TAPERING

TAPERED COLUMNS  
 3203  
 GS  
 STRUCTURAL MEMBERS  
 .COLUMNS (SUPPORTS)  
 .#TAPERED COLUMNS

TAPERED WINGS  
 USE  
 SWEEP WINGS

TAPERING  
 3408  
 UF  
 TAPER  
 RT  
 CONVERGENCE  
 DECELERATION  
 % REDUCTION

% TAPES  
 O801 O802 O803 1502 1504 1507  
 SN  
 (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)

RT  
 ADHESIVES  
 AUDIO TAPES  
 COMPUTER COMPATIBLE TAPES  
 FASTENERS  
 HEAT TAPES  
 MAGNETIC TAPES  
 PLASTIC TAPES  
 PLAYBACKS  
 PUNCHED TAPES  
 RIBBONS  
 SEALS (STOPPERS)  
 SPLICING  
 VIDEO TAPES

TAPS  
 O902 O904  
 RT  
 CUTTERS  
 DRILLS  
 MACHINE TOOLS  
 TOOLS

TAR SANDS  
 1306 1805 1806  
 GS  
 RESOURCES  
 .EARTH RESOURCES  
 .#TAR SANDS  
 SEDIMENTS  
 .SANDS  
 .#TAR SANDS  
 SOILS  
 .SANDS  
 .#TAR SANDS  
 RT  
 DISTILLATION

OIL EXPLORATION  
 OIL FIELDS  
 OILS  
 TARS

TARE (DATA REDUCTION)  
 USE  
 DATA REDUCTION

TARGET ACQUISITION  
 O709 1410 2102 3101 3401  
 GS  
 ACQUISITION  
 #TARGET ACQUISITION  
 RT  
 DETECTION  
 HIGH ALT TARGET AND BACKGROUND  
 MEASUREMENT  
 MATTS (SYSTEMS)  
 MISSILE DETECTION  
 MOVING TARGET INDICATORS  
 MULTIPLE TARGET TRACKING  
 SOUND RANGING  
 SURVEILLANCE  
 TARGETS

TARGET DRONE AIRCRAFT  
 O201 O207 3401  
 GS  
 DRONE VEHICLES  
 .DRONE AIRCRAFT  
 .#TARGET DRONE AIRCRAFT  
 ...FIREBEE 2 TARGET DRONE AIRCRAFT  
 ...JINDIVIK TARGET AIRCRAFT  
 PIOTLESS AIRCRAFT  
 .DRONE AIRCRAFT  
 .#TARGET DRONE AIRCRAFT  
 ...FIREBEE 2 TARGET DRONE AIRCRAFT  
 ...JINDIVIK TARGET AIRCRAFT  
 RT % AIRCRAFT  
 % MILITARY AIRCRAFT  
 REMOTELY PILOTED VEHICLES  
 TARGETS

TARGET MASKING  
 O701  
 GS  
 MASKING  
 #TARGET MASKING  
 RT  
 COUNTERMEASURES  
 TARGETS

TARGET PENETRATION  
 USE  
 TERMINAL BALLISTICS

TARGET RECOGNITION  
 O502 O705 2103 3401  
 GS  
 DETECTION  
 #TARGET RECOGNITION  
 RECOGNITION

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                            |                                                                                                                          |                                                                                                                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                          | #TARGET RECOGNITION<br>DISCRIMINATION<br>LASER TARGET DESIGNATORS<br>MISSILE DETECTION<br>MISSILE SIGNATURES<br>MULTIPLE TARGET TRACKING<br>MULTISTATIC RADAR<br>NAP-OF-THE-EARTH NAVIGATION<br>RADAR HOMING MISSILES<br>RADAR SIGNATURES<br>SIGNATURE ANALYSIS<br>SURVEILLANCE<br>TARGETS<br>TRADEX RADAR SYSTEM                                                                                                                                                       | RADAR ECHOS<br>SANDPIPER TARGET MISSILE<br>SURVEILLANCE<br>TARGET ACQUISITION<br>TARGET DRONE AIRCRAFT<br>TARGET MASKING<br>TARGET RECOGNITION<br>TARGET THICKNESS                                                         | RT                                                                                                                       | .VISUAL TASKS<br>COSTS<br>CREW PROCEDURES (INFLIGHT)<br>CREW PROCEDURES (PREFLIGHT)<br>% ELEMENTS<br>MATRIX MANAGEMENT<br>PHYSICAL WORK<br>PROJECTS<br>QUALITY CONTROL<br>RETRAINING<br>SCHEDULING<br>TASK PLANNING (ROBOTICS)<br>% TESTS |
| TARGET<br>1107<br>GS        | SIMULATORS<br>1108 3201 3501<br>SIMULATORS                                                                                                                                                                                                                                                                                                                                                                                                                              | TARS<br>1808<br>GS<br>3404<br>PRODUCTS<br>.PETROLEUM PRODUCTS<br>.#TARS<br>ASPHALT<br>GUMS (SUBSTANCES)<br>PITCH (MATERIAL)<br>TAR SANDS                                                                                   | TASMANIA<br>1305<br>GS                                                                                                   |                                                                                                                                                                                                                                           |
| RT                          | #TARGET SIMULATORS<br>COMPUTERIZED SIMULATION<br>DISPLAY DEVICES                                                                                                                                                                                                                                                                                                                                                                                                        | RT<br>TARTAR MISSILE<br>3101 3401<br>GS<br>MISSILES<br>.ANTI-AIRCRAFT MISSILES<br>.#TARTAR MISSILE<br>.SURFACE TO AIR MISSILES<br>.#TARTAR MISSILE<br>AJ-10 ENGINE<br>BUMBLEBEE PROJECT<br>SOLID PROPELLANT ROCKET ENGINES | RT                                                                                                                       | LANDFORMS<br>.ISLANDS<br>.#TASMANIA<br>AUSTRALIA                                                                                                                                                                                          |
| TARGET<br>2202<br>GS        | THICKNESS<br>3201 3203<br>DIMENSIONS<br>#TARGET THICKNESS                                                                                                                                                                                                                                                                                                                                                                                                               | RT<br>TASTE<br>O408<br>UF<br>GS<br>GUSTATORY PERCEPTION<br>PERCEPTION<br>.SENSORY PERCEPTION<br>.#TASTE<br>CHEMORECEPTORS<br>SYNTHETIC FOOD                                                                                |                                                                                                                          |                                                                                                                                                                                                                                           |
| RT                          | PARTICLE ACCELERATOR TARGETS<br>TARGETS<br>THICKNESS                                                                                                                                                                                                                                                                                                                                                                                                                    | TATB<br>2701<br>UF<br>GS<br>TRIAMINOTRINITROBENZENE<br>EXPLOSIVES<br>#TATB<br>PROPELLANTS<br>.ROCKET PROPELLANTS<br>.#TATB<br>ROCKET OXIDIZERS                                                                             |                                                                                                                          |                                                                                                                                                                                                                                           |
| TARGET<br>USE               | TRACKING<br>TRACKING (POSITION)                                                                                                                                                                                                                                                                                                                                                                                                                                         | TASK COMPLEXITY<br>O408 0410 0502<br>GS<br>COMPLEXITY<br>#TASK COMPLEXITY<br>RT<br>COSTS<br>% PERFORMANCE<br>QUALITY CONTROL<br>SCHEDULING                                                                                 |                                                                                                                          |                                                                                                                                                                                                                                           |
| TARGETS<br>0701<br>UF<br>GS | 0702 1904 2311 3006 3401<br>TOWED TARGETS<br>TARGETS<br>.JINDIVIK TARGET AIRCRAFT<br>.LASER TARGETS<br>.PARTICLE ACCELERATOR TARGETS<br>.RADAR TARGETS<br>.RADAR TARGET SCATTER SITE PROGRAM<br>AIRBORNE INTEGRATED RECONNAISSANCE<br>SYSTEM<br>COMMAND AND CONTROL<br>DETECTION<br>FIREBEE 2 TARGET DRONE AIRCRAFT<br>IRRADIATION<br>LASER TARGET DESIGNATORS<br>LASER TARGET INTERACTIONS<br>LINE OF SIGHT<br>MICROBALLOONS<br>% MISSIONS<br>MULTIPLE TARGET TRACKING | TASK PLANNING (ROBOTICS)<br>1504 3406<br>GS<br>PLANNING<br>#TASK PLANNING (ROBOTICS)<br>RT<br>ROBOTICS<br>ROBOTS<br>SCHEDULING<br>TASKS<br>TELEOPERATORS<br>TELEROBOTICS                                                   | TAURID<br>3005<br>GS<br>CELESTIAL BODIES<br>.METEOROID SHOWERS<br>.#TAURID METEORIDS<br>.METEORIDS<br>.#TAURID METEORIDS |                                                                                                                                                                                                                                           |
| RT                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TASKS<br>0408 0410 0502<br>UF<br>GS<br>JOBS<br>#TASKS<br>.AUDITORY TASKS                                                                                                                                                   | TAURUS<br>3001<br>GS<br>CONSTELLATIONS<br>#TAURUS CONSTELLATION<br>CRAB NEBULA<br>PLEIADES CLUSTER<br>T TAURI STARS      |                                                                                                                                                                                                                                           |

# NASA THESAURUS HIERARCHICAL UPDATE

|                                         |  |  |  |  |  |
|-----------------------------------------|--|--|--|--|--|
| TAUTOMERS                               |  |  |  |  |  |
| 0603 1808                               |  |  |  |  |  |
| RT CONGENERS                            |  |  |  |  |  |
| ISOMERS                                 |  |  |  |  |  |
| TAXIING                                 |  |  |  |  |  |
| 0201 0203                               |  |  |  |  |  |
| RT AIR TRAFFIC CONTROL                  |  |  |  |  |  |
| AIRFIELD SURFACE MOVEMENTS              |  |  |  |  |  |
| RUNWAYS                                 |  |  |  |  |  |
| TAXONOMY                                |  |  |  |  |  |
| 0402 0404 0409                          |  |  |  |  |  |
| RT CLASSIFICATIONS                      |  |  |  |  |  |
| % CLASSIFYING                           |  |  |  |  |  |
| % SCIENCE                               |  |  |  |  |  |
| % ZOOLOGY                               |  |  |  |  |  |
| TAYLOR INSTABILITY                      |  |  |  |  |  |
| 1202 2502                               |  |  |  |  |  |
| RT DENSITY DISTRIBUTION                 |  |  |  |  |  |
| GOERTLER INSTABILITY                    |  |  |  |  |  |
| INTERFACE STABILITY                     |  |  |  |  |  |
| PERTURBATION THEORY                     |  |  |  |  |  |
| ROTATING FLUIDS                         |  |  |  |  |  |
| TWO DIMENSIONAL FLOW                    |  |  |  |  |  |
| TAYLOR MANIFEST ANXIETY SCALE           |  |  |  |  |  |
| 0408 0410 1905                          |  |  |  |  |  |
| RT ANXIETY                              |  |  |  |  |  |
| PHYSIOLOGICAL TESTS                     |  |  |  |  |  |
| PSYCHOLOGICAL EFFECTS                   |  |  |  |  |  |
| PSYCHOLOGICAL TESTS                     |  |  |  |  |  |
| TAYLOR SERIES                           |  |  |  |  |  |
| 1902                                    |  |  |  |  |  |
| UF TAYLOR THEOREM                       |  |  |  |  |  |
| GS ANALYSIS (MATHEMATICS)               |  |  |  |  |  |
| .CALCULUS                               |  |  |  |  |  |
| ..SERIES (MATHEMATICS)                  |  |  |  |  |  |
| ...POWER SERIES                         |  |  |  |  |  |
| ...#TAYLOR SERIES                       |  |  |  |  |  |
| ....MACLAURIN SERIES                    |  |  |  |  |  |
| .REAL VARIABLES                         |  |  |  |  |  |
| ..SERIES (MATHEMATICS)                  |  |  |  |  |  |
| ...POWER SERIES                         |  |  |  |  |  |
| ...#TAYLOR SERIES                       |  |  |  |  |  |
| ....MACLAURIN SERIES                    |  |  |  |  |  |
| RT THEOREMS                             |  |  |  |  |  |
| TAYLOR THEOREM                          |  |  |  |  |  |
| USE TAYLOR SERIES                       |  |  |  |  |  |
| TAYLOR-GOERTLER INSTABILITY             |  |  |  |  |  |
| USE GOERTLER INSTABILITY                |  |  |  |  |  |
| TCG (TRACKING)                          |  |  |  |  |  |
| USE TRANSPONDER CONTROL GROUP           |  |  |  |  |  |
| TCV PROGRAM                             |  |  |  |  |  |
| USE TERMINAL CONFIGURED VEHICLE PROGRAM |  |  |  |  |  |
| TD SATELLITES                           |  |  |  |  |  |
| 1307                                    |  |  |  |  |  |
| GS ARTIFICIAL SATELLITES                |  |  |  |  |  |
| .ESA SATELLITES                         |  |  |  |  |  |
| .#TD SATELLITES                         |  |  |  |  |  |
| ...TD-1 SATELLITE                       |  |  |  |  |  |
| .SYNCHRONOUS SATELLITES                 |  |  |  |  |  |
| .#TD SATELLITES                         |  |  |  |  |  |
| ...TD-1 SATELLITE                       |  |  |  |  |  |
| ESA SPACECRAFT                          |  |  |  |  |  |
| .ESA SATELLITES                         |  |  |  |  |  |
| .#TD SATELLITES                         |  |  |  |  |  |
| ...TD-1 SATELLITE                       |  |  |  |  |  |
| TD-1 SATELLITE                          |  |  |  |  |  |
| 3107                                    |  |  |  |  |  |
| GS ARTIFICIAL SATELLITES                |  |  |  |  |  |
| .ESA SATELLITES                         |  |  |  |  |  |
| .#TD SATELLITES                         |  |  |  |  |  |
| ...TD-1 SATELLITE                       |  |  |  |  |  |
| .SYNCHRONOUS SATELLITES                 |  |  |  |  |  |
| .#TD SATELLITES                         |  |  |  |  |  |
| ...TD-1 SATELLITE                       |  |  |  |  |  |
| ESA SPACECRAFT                          |  |  |  |  |  |
| .ESA SATELLITES                         |  |  |  |  |  |
| .#TD SATELLITES                         |  |  |  |  |  |
| ...TD-1 SATELLITE                       |  |  |  |  |  |
| TDMA                                    |  |  |  |  |  |
| USE TIME DIVISION MULTIPLE ACCESS       |  |  |  |  |  |
| TDR SATELLITES                          |  |  |  |  |  |
| 3107                                    |  |  |  |  |  |
| UF TRACKING AND DATA RELAY SATELLITES   |  |  |  |  |  |
| RT AUTONOMOUS SPACECRAFT CLOCKS         |  |  |  |  |  |
| COMMUNICATING                           |  |  |  |  |  |
| DATA TRANSMISSION                       |  |  |  |  |  |
| RADIO RELAY SYSTEMS                     |  |  |  |  |  |
| SATELLITE NETWORKS                      |  |  |  |  |  |
| SATELLITE TRANSMISSION                  |  |  |  |  |  |
| TELECOMMUNICATION                       |  |  |  |  |  |
| TELEMETRY                               |  |  |  |  |  |
| TEA LASERS                              |  |  |  |  |  |
| 1203 1601 2311 3304                     |  |  |  |  |  |
| UF TRANSVERSELY EXCITED ATMOSPHERIC     |  |  |  |  |  |
| LASERS                                  |  |  |  |  |  |
| TECHNETIUM                              |  |  |  |  |  |
| 1703 2406                               |  |  |  |  |  |
| GS CHEMICAL ELEMENTS                    |  |  |  |  |  |
| #TECHNETIUM                             |  |  |  |  |  |
| METALS                                  |  |  |  |  |  |
| .TRANSITION METALS                      |  |  |  |  |  |

.#TECHNETIUM  
 TECHNITIUM COMPOUNDS  
 O603 1804  
 GS #TECHNETIUM COMPOUNDS  
 .TECHNETIUM FLUORIDES  
 RT % CHEMICAL COMPOUNDS  
 % GROUP 7B COMPOUNDS  
 % METAL COMPOUNDS  
 TECHNITIUM FLUORIDES  
 O603 1804  
 GS HALOGEN COMPOUNDS  
 .FLUORINE COMPOUNDS  
 ..FLUORIDES  
 ..#TECHNETIUM FLUORIDES  
 .HALIDES  
 ..FLUORIDES  
 ..#TECHNETIUM FLUORIDES  
 ..METAL HALIDES  
 ..#TECHNETIUM FLUORIDES  
 TECHNITIUM COMPOUNDS  
 #TECHNETIUM FLUORIDES  
 TECHNITIUM ISOTOPES  
 O603 1703  
 GS METALS  
 .TRANSITION METALS  
 .#TECHNETIUM ISOTOPES  
 TECHNICAL WRITING  
 3404 3405  
 RT ABSTRACTS  
 DOCUMENTATION  
 EDITING  
 RECORDS  
 SPECIFICATIONS  
 TRANSLATING  
 TECHNIQUES  
 USE METHODOLOGY  
 TECHNOLOGICAL FORECASTING  
 1905 3402 3404  
 GS FORECASTING  
 #TECHNOLOGICAL FORECASTING  
 ..DELPHI METHOD (FORECASTING)  
 ..PATTERN METHOD (FORECASTING)  
 ..PROBE METHOD (FORECASTING)  
 ..PROFILE METHOD (FORECASTING)  
 AEROSPACE TECHNOLOGY TRANSFER  
 ESTIMATING  
 PREDICTIONS  
 TECHNOLOGY TRANSFER  
 .#TECHNOLOGIES  
 3404  
 GS #TECHNOLOGIES  
 .BIOTECHNOLOGY  
 .BUBBLE TECHNIQUE  
 .ENERGY TECHNOLOGY  
 ..GEOTHERMAL TECHNOLOGY  
 .MARINE TECHNOLOGY  
 .MILITARY TECHNOLOGY  
 .REACTOR TECHNOLOGY  
 INDUSTRIES  
 LOW GRAVITY MANUFACTURING  
 MANUFACTURING  
 NUCLEONICS  
 SPACE MANUFACTURING  
 TECHNOLOGY ASSESSMENT  
 TECHNOLOGY UTILIZATION  
 URBAN DEVELOPMENT  
 TECHNOLOGY ASSESSMENT  
 3402 3403 3404 3406 3409  
 GS ASSESSMENTS  
 #TECHNOLOGY ASSESSMENT  
 CANADIAN SPACE PROGRAM  
 COMMUNICATIONS TECHNOLOGY SATELLITE  
 DELPHI METHOD (FORECASTING)  
 EVALUATION  
 FEASIBILITY ANALYSIS  
 INDUSTRIES  
 MANUFACTURING  
 PATTERN METHOD (FORECASTING)  
 PROBE METHOD (FORECASTING)  
 PROFILE METHOD (FORECASTING)  
 STRATEGIC MATERIALS  
 TECHNOLOGIES  
 VALUE  
 TECHNOLOGY FEASIBILITY SPACECRAFT  
 3110  
 GS UNMANNED SPACECRAFT  
 #TECHNOLOGY FEASIBILITY SPACECRAFT  
 RT SCIENTIFIC SATELLITES  
 % SPACECRAFT  
 TECHNOLOGY TRANSFER  
 3404 3405  
 GS #TECHNOLOGY TRANSFER  
 .AEROSPACE TECHNOLOGY TRANSFER  
 RT COMMUNICATION  
 DOCUMENTATION  
 DOCUMENTS  
 INFORMATION FLOW  
 INFORMATION MANAGEMENT  
 INFORMATION TRANSFER  
 REPORTS  
 SELECTIVE DISSEMINATION OF  
 INFORMATION  
 SPACE COMMERCIALIZATION  
 STARSITE PROGRAM  
 TECHNOLOGICAL FORECASTING  
 TECHNOLOGY UTILIZATION  
 TRANSFERRING  
 TECHNOLOGY UTILIZATION  
 3404  
 RT AEROSPACE TECHNOLOGY TRANSFER  
 CANADIAN SPACE PROGRAM  
 COMMUNICATIONS TECHNOLOGY SATELLITE  
 CONTROL CONFIGURED VEHICLES  
 GENERAL OVERVIEWS  
 INDIAN SPACE PROGRAM  
 INDUSTRIES  
 INFORMATION TRANSFER  
 LASER APPLICATIONS  
 MANUFACTURING  
 NASA PROGRAMS  
 PATENT APPLICATIONS  
 RESEARCH AND DEVELOPMENT  
 SYNCHRONOUS EARTH OBSERVATORY  
 SATELLITE  
 TECHNOLOGIES  
 TECHNOLOGY TRANSFER  
 UTILIZATION  
 TECTONIC MOVEMENT  
 USE TECTONICS  
 TECTONICS  
 1306 1308  
 UF TECTONIC MOVEMENT  
 GS GEOLOGY  
 #TECTONICS  
 RT % DEPRESSION  
 EARTH MOVEMENTS  
 EARTH PLANETARY STRUCTURE  
 FISSURES (GEOLOGY)  
 GEOPHYSICS  
 PLATES (TECTONICS)  
 SEA FLOOR SPREADING  
 SUBDUCTION (GEOLOGY)  
 TED USE TRANSFERRED ELECTRON DEVICES  
 TEDLAR (TRADEMARK)  
 USE POLYVINYL FLUORIDE  
 TEE  
 USE T SHAPE

# NASA THESAURUS HIERARCHICAL UPDATE

## TEETERING

2311 3407  
RT % MOTION

## TEETH

0402 0405  
SN (EXCLUDES GEAR TEETH AND OTHER  
MECHANICAL DEVICES)  
GS ANATOMY  
.DIGESTIVE SYSTEM  
.#TEETH  
RT DENTAL CALCULI  
DENTISTRY  
MASTICATION  
MOUTH  
ORAL HYGIENE  
TOOTH DISEASES

## TEFLON (TRADEMARK)

1808 1810  
GS HALOGEN COMPOUNDS  
.FLUORINE COMPOUNDS  
.FLUORO COMPOUNDS  
.DIFLUORO COMPOUNDS  
.POLYTETRAFLUOROETHYLENE  
.#TEFLON (TRADEMARK)  
PLASTICS  
.POLYTETRAFLUOROETHYLENE  
.#TEFLON (TRADEMARK)  
RT % POLYMERS  
RESINS  
SYNTHETIC RESINS

## TEKTITE PROJECT

3409  
GS PROGRAMS  
.NASA PROGRAMS  
.NASA SPACE PROGRAMS  
.#TEKTITE PROJECT  
.SPACE PROGRAMS  
.NASA SPACE PROGRAMS  
.#TEKTITE PROJECT

## TEKTITES

1305 1806 3005  
GS CELESTIAL BODIES  
.METEORITES  
.STONY METEORITES  
.#TEKTITES  
.AUSTRALITES  
.BEDIASITES  
RT CHONDRITES  
COESITE  
CYRILLID METEORIDS

METEORITIC COMPOSITION  
METEORITIC MICROSTRUCTURES  
MICROMETEORITES  
NATURAL SATELLITES

## TELECHIRICS

USE REMOTE HANDLING

## TELECOMMUNICATION

0702 0707 0708 0709  
UF COMMUNICATION SYSTEMS  
GS #TELECOMMUNICATION  
.AIRCRAFT COMMUNICATION  
.BROADCASTING  
.CLOSED CIRCUIT TELEVISION  
.COLOR TELEVISION  
.COMMUNICATION  
.FACSIMILE COMMUNICATION  
.LINE OF SIGHT COMMUNICATION  
.OPTICAL COMMUNICATION  
.SHIP TO SHORE COMMUNICATION  
.UNDERWATER COMMUNICATION  
.DATA LINKS  
.DEFENSE COMMUNICATIONS SATELLITE  
SYSTEM  
.FLEET SATELLITE COMMUNICATION  
SYSTEM  
.DEFENSE COMMUNICATIONS SYSTEM  
(DCS)  
.EDUCATIONAL TELEVISION  
.ELECTRONIC MAIL  
.GROUND-AIR-GROUND COMMUNICATION  
.HET EXPERIMENT  
.MULTICHANNEL COMMUNICATION  
.MULTIPLE ACCESS  
.ALOHA SYSTEM  
.CODE DIVISION MULTIPLE ACCESS  
.DEMAND ASSIGNMENT MULTIPLE ACCESS  
.FREQUENCY DIVISION MULTIPLE  
ACCESS  
.TIME DIVISION MULTIPLE ACCESS  
.PACKET TRANSMISSION  
.ALOHA SYSTEM  
.PLAT SYSTEM  
.PULSE COMMUNICATION  
.DIGITAL SPACECRAFT TELEVISION  
.RADIO COMMUNICATION  
.RADIO RELAY SYSTEMS  
.CODE DIVISION MULTIPLE ACCESS  
.TIME DIVISION MULTIPLE ACCESS  
.RADIO TELEGRAPHY  
.RADIO TELEMETRY  
.PULSE FREQUENCY MODULATION  
TELEMETRY  
.TELEPHONY

RT

.RADIOTELEPHONES  
.SINGLE CHANNEL PER CARRIER  
TRANSMISSION  
.SPACE COMMUNICATION  
.EXTRATERRESTRIAL COMMUNICATION  
.INTERPLANETARY COMMUNICATION  
.LUNAR COMMUNICATION  
.CIRCUMLUNAR COMMUNICATION  
.SPACECRAFT COMMUNICATION  
.REENTRY COMMUNICATION  
.SATELLITE COMMUNICATION  
.SPACECRAFT ANTENNAS  
.SPACECRAFT TELEVISION  
.DIGITAL SPACECRAFT TELEVISION  
.RANGER BLOCK 3 TELEVISION SYSTEM  
.SATELLITE TELEVISION  
.STEREOTELEVISION  
.TELEMETRY  
.BIOTELEMETRY  
.P.A.C.M. TELEMETRY  
.PCM TELEMETRY  
.RADIO TELEMETRY  
.PULSE FREQUENCY MODULATION  
TELEMETRY  
.TRANSOCEANIC COMMUNICATION  
.VIDEO COMMUNICATION  
.VOICE COMMUNICATION  
.TELEPHONY  
.WIDEBAND COMMUNICATION  
.WIRELESS COMMUNICATION  
ACCESS CONTROL  
ANTENNAS  
ARPA COMPUTER NETWORK  
AUTOMATIC REPEAT REQUEST  
CHANNELS  
% CODE DIVISION MULTIPLEXING  
COMMUNICATING  
COMMUNICATION NETWORKS  
COMMUNICATION SATELLITES  
COMPUTERS  
DATA COMPRESSION  
DATA PROCESSING  
DATA SAMPLING  
DATA TRANSMISSION  
DEMODULATION  
% DETECTORS  
DIGITAL SYSTEMS  
DIRECT BROADCAST SATELLITES  
ELECTROMAGNETIC RADIATION  
FREQUENCY DIVISION MULTIPLEXING  
INFORMATION THEORY  
INTERFACES  
INTERPHONES  
MODULATION  
MOLNIYA SATELLITES

|                                    |                                    |  |                                    |
|------------------------------------|------------------------------------|--|------------------------------------|
| MORSE CODE                         | TEMPORAL DISTRIBUTION              |  |                                    |
| NASCOM NETWORK                     | TELEGRAPH SYSTEMS                  |  | SIGNAL PROCESSING                  |
| ONBOARD EQUIPMENT                  | 0701 0702 0710 2402                |  | SINGLE CHANNEL PER CARRIER         |
| PACKET SWITCHING                   | UF TELEGRAPHY                      |  | TRANSMISSION                       |
| POINT TO POINT COMMUNICATION       | RT PULSE COMMUNICATION             |  | SPIRAL ANTENNAS                    |
| SATELLITE ANTENNAS                 | RADIO COMMUNICATION                |  | TDR SATELLITES                     |
| SEAFARER PROJECT                   | SINGLE CHANNEL PER CARRIER         |  | TIME DIVISION MULTIPLEXING         |
| SIGNAL DETECTION                   | TRANSMISSION                       |  | TRAJECTORY MEASUREMENT             |
| SIGNAL DETECTORS                   | % SYSTEMS                          |  | TRANSPONDER CONTROL GROUP          |
| SIGNAL ENCODING                    | TELECOMMUNICATION                  |  | WEATHER DATA RECORDERS             |
| SIGNAL TRANSMISSION                | TELEPRINTERS                       |  | WIRELESS COMMUNICATION             |
| % SIGNALS                          | TELETYPEWRITERS                    |  |                                    |
| % SYSTEMS                          | WESTAR SATELLITES                  |  | TELEOPERATOR MANEUVERING SYSTEM    |
| TDR SATELLITES                     |                                    |  | USE TELEOPERATORS                  |
| TELECONFERENCING                   |                                    |  |                                    |
| TELEGRAPH SYSTEMS                  | TELEGRAPHY                         |  | TELEOPERATORS                      |
| TELETYPEWRITER SYSTEMS             | USE TELEGRAPH SYSTEMS              |  | 0503 2102 2104                     |
| TELEVISION SYSTEMS                 | TELEMETERS                         |  | UF TELEOPERATOR MANEUVERING SYSTEM |
| TRANSCONTINENTAL SYSTEMS           | USE TELEMETRY                      |  | GS CONTROL EQUIPMENT               |
| TRANSMISSION                       |                                    |  | #TELEOPERATORS                     |
| TRANSMISSION CIRCUITS              | TELEMETRY                          |  | RT HUMAN FACTORS ENGINEERING       |
| TRANSMISSION LINES                 | 0708                               |  | MAN MACHINE SYSTEMS                |
| TRANSMISSION RATE (COMMUNICATIONS) | UF TELEMETERS                      |  | MANIPULATORS                       |
| TRANSMITTERS                       | GS TELECOMMUNICATION               |  | REMOTE CONTROL                     |
| TRANSOCEANIC SYSTEMS               | #TELEMETRY                         |  | ROBOTICS                           |
| VIDEO DATA                         | ..BIOTELEMETRY                     |  | TACTILE SENSORS (ROBOTICS)         |
| VSAT (NETWORK)                     | ..P.A.C.M. TELEMETRY               |  | TASK PLANNING (ROBOTICS)           |
| WESTAR SATELLITES                  | ..PCM TELEMETRY                    |  | TELEROBOTICS                       |
|                                    | ...RADIO TELEMETRY                 |  | TORQUE SENSORS (ROBOTICS)          |
|                                    | ...PULSE FREQUENCY MODULATION      |  |                                    |
| TELECONFERENCING                   | TELEMETRY                          |  | TELEPHONES                         |
| 0702 0707 0708 0709 9001           | TRANSMISSION                       |  | 0701 0702                          |
| GS #TELECONFERENCING               | .SIGNAL TRANSMISSION               |  | GS #TELEPHONES                     |
| .HET EXPERIMENT                    | .#TELEMETRY                        |  | .RADIO TELEPHONES                  |
| RT COMMUNICATION SATELLITES        | ...BIOTELEMETRY                    |  | RT EARPHONES                       |
| COMPUTER CONFERENCING              | ...P.A.C.M. TELEMETRY              |  | TELEPHONY                          |
| CONFERENCES                        | ...PCM TELEMETRY                   |  | UTILITIES                          |
| MULTICHANNEL COMMUNICATION         | ...RADIO TELEMETRY                 |  |                                    |
| MULTIMEDIA                         | ...PULSE FREQUENCY MODULATION      |  | TELEPHONY                          |
| SATELLITE NETWORKS                 | TELEMETRY                          |  | 0702 0705 0710 0902                |
| TELECOMMUNICATION                  | ADVANCED RANGE INSTRUMENTATION     |  | GS TELECOMMUNICATION               |
|                                    | AIRCRAFT                           |  | .RADIO COMMUNICATION               |
| TELECONNECTIONS (METEOROLOGY)      | COMMUNICATION EQUIPMENT            |  | .#TELEPHONY                        |
| 2001 2003                          | DATA COMPRESSION                   |  | .VOICE COMMUNICATION               |
| RT CLIMATOLOGY                     | DATA LINKS                         |  | .#TELEPHONY                        |
| CORRELATION                        | DATA RETRIEVAL                     |  | TRANSMISSION                       |
| DATA CORRELATION                   | DATA TRANSMISSION                  |  | #TELEPHONY                         |
| EARTH ATMOSPHERE                   | DECOMMUTATORS                      |  | COMMUNICATION EQUIPMENT            |
| METEOROLOGICAL PARAMETERS          | DIFFERENTIAL PULSE CODE MODULATION |  | CROSSTALK                          |
| METEOROLOGY                        | IN-FLIGHT MONITORING               |  | ECHO SUPPRESSORS                   |
| SECULAR VARIATIONS                 | MEASURING INSTRUMENTS              |  | RADIO TELEPHONES                   |
| SIGNIFICANCE                       | PULSE COMMUNICATION                |  | SINGLE CHANNEL PER CARRIER         |
| SPATIAL DISTRIBUTION               | RADIO COMMUNICATION                |  | TRANSMISSION                       |
| STATISTICAL ANALYSIS               | SHIP TO SHORE COMMUNICATION        |  | SOUND TRANSMISSION                 |
| STATISTICAL CORRELATION            |                                    |  | SYMPHONIE SATELLITES               |
| SYNOPTIC METEOROLOGY               |                                    |  |                                    |



# NASA THESAURUS HIERARCHICAL UPDATE

|                               |           |                                    |                               |
|-------------------------------|-----------|------------------------------------|-------------------------------|
| TELEPHONES                    | 1412 3001 | ASTRONOMICAL TELESCOPES            | OPTICAL EQUIPMENT             |
| VERBAL COMMUNICATION          | UF        | TELESCOPES                         | OPTICAL MEASURING INSTRUMENTS |
|                               | GS        | .CELESCOPES                        | OPTICAL TRANSFER FUNCTION     |
| TELEPHOTOMETERS               |           | .CIRCUMSOLAR TELESCOPES            | PERISCOPES                    |
| USE TELEPHOTOMETRY            |           | .GAMMA RAY TELESCOPES              | REFLECTORS                    |
|                               |           | .GRAZING INCIDENCE TELESCOPES      | SCHMIDT CAMERAS               |
| TELEPHOTOMETRY                |           | .GRIST (TELESCOPE)                 | SEEING (ASTRONOMY)            |
| 1406 2306 2310                |           | .HELIOMETERS                       | SOLAR INSTRUMENTS             |
| UF                            |           | .PYROHELIOMETERS                   | SPACEBORNE ASTRONOMY          |
| GS                            |           | .INFRARED TELESCOPES               | ULTRAVIOLET ASTRONOMY         |
|                               |           | .LARGE DEPLOYABLE REFLECTOR        |                               |
| RT                            |           | .SPACE INFRARED TELESCOPE FACILITY | TELESCOPING STRUCTURES        |
|                               |           | .MANNED ORBITAL TELESCOPES         | USE FOLDING STRUCTURES        |
| ASTRONOMICAL PHOTOMETRY       |           | .APOLLO TELESCOPE MOUNT            |                               |
| OPTICAL MEASURING INSTRUMENTS |           | .PARTICLE TELESCOPES               | TELETYPEWRITER SYSTEMS        |
| PHOTOMETERS                   |           | .RADIO TELESCOPES                  | 0702 1504 3405                |
| TRANSMISSOMETERS              |           | .KILOMETER WAVE ORBITING TELESCOPE | RT                            |
|                               |           | .VERY LARGE ARRAY (VLA)            | FACSIMILE COMMUNICATION       |
| TELEPRINTERS                  |           | .REFLECTING TELESCOPES             | MICROWAVE TRANSMISSION        |
| 0702 0703 1504 3405           |           | .LARGE DEPLOYABLE REFLECTOR        | % SYSTEMS                     |
| GS                            |           | .STARSAT TELESCOPE                 | TELECOMMUNICATION             |
|                               |           | .REFRACTING TELESCOPES             | TELETYPEWRITERS               |
| RT                            |           | .SCHMIDT TELESCOPES                |                               |
|                               |           | .SPACEBORNE TELESCOPES             | TELETYPEWRITERS               |
|                               |           | .GERMAN INFRARED LABORATORY        | ..TELEPRINTERS                |
|                               |           | .HUBBLE SPACE TELESCOPE            | KEYING                        |
|                               |           | .INFRARED SPACE OBSERVATORY (ISO)  | RECEIVERS                     |
|                               |           | .LARGE DEPLOYABLE REFLECTOR        | TELEGRAPH SYSTEMS             |
|                               |           | .LIRTS (TELESCOPE)                 | TELETYPEWRITER SYSTEMS        |
|                               |           | .SOLAR OPTICAL TELESCOPE           |                               |
|                               |           | .SPACE INFRARED TELESCOPE FACILITY | TELEVISION CAMERAS            |
|                               |           | .STARSAT                           | 0701 0702 1410 1412 2903 9001 |
|                               |           | .X RAY ASTROPHYSICS FACILITY       | GS                            |
|                               |           | .SPECTROSCOPIC TELESCOPES          | OPTICAL EQUIPMENT             |
|                               |           | .MULTISPECTRAL TRACKING TELESCOPES | .CAMERAS                      |
|                               |           | .STRATOSCOPE TELESCOPES            | .#TELEVISION CAMERAS          |
|                               |           | .ULTRAVIOLET TELESCOPES            | PHOTOGRAPHIC EQUIPMENT        |
|                               |           | .STARLAB                           | .CAMERAS                      |
|                               |           | .X RAY TELESCOPES                  | .#TELEVISION CAMERAS          |
|                               |           | .X RAY ASTROPHYSICS FACILITY       | TELEVISION EQUIPMENT          |
| RT                            |           | ANTENNAS                           | #TELEVISION CAMERAS           |
|                               |           | ASTRONOMICAL OBSERVATORIES         | CAMERA TUBES                  |
|                               |           | ASTRONOMY                          | CLOSED CIRCUIT TELEVISION     |
|                               |           | BALLOON-BORNE INSTRUMENTS          | LALLEMAND CAMERAS             |
|                               |           | BINOCULARS                         | OPTICAL SCANNERS              |
|                               |           | CASSEGRAIN OPTICS                  | ORTHICONS                     |
|                               |           | CORONAGRAPHS                       | RASTER SCANNING               |
|                               |           | ETALONS                            | RETURN BEAM VIDICONS          |
|                               |           | EYEPIECES                          | SATELLITE TELEVISION          |
|                               |           | LENSES                             |                               |
|                               |           | MIRRORS                            | TELEVISION EQUIPMENT          |
|                               |           | MULTI-ANODE MICROCHANNEL ARRAYS    | 0701 0702 1410 1412           |
|                               |           |                                    | GS                            |
|                               |           |                                    | #TELEVISION EQUIPMENT         |
|                               |           |                                    | .IMAGE DISSECTOR TUBES        |

[illegible]



|                                   |      |                                    |
|-----------------------------------|------|------------------------------------|
| SURFACE COOLING                   | 1902 | DEPENDENCE                         |
| TEMPERATURE COMPENSATION          | GS   | #TEMPERATURE DEPENDENCE            |
| TEMPERATURE CONTROL               | RT   | HEAT AFFECTED ZONE                 |
| TEMPERATURE DEPENDENCE            |      | HOT CORROSION                      |
| TEMPERATURE DISTRIBUTION          |      | MISCIBILITY GAP                    |
| TEMPERATURE EFFECTS               |      | TEMPERATURE                        |
| TEMPERATURE GRADIENTS             |      | TEMPERATURE EFFECTS                |
| TEMPERATURE INVERSIONS            |      | THERMAL DEGRADATION                |
| TEMPERATURE MEASUREMENT           |      | THERMAL STABILITY                  |
| TEMPERATURE MEASURING INSTRUMENTS |      |                                    |
| TEMPERATURE PROBES                |      | TEMPERATURE DIFFERENCES            |
| TEMPERATURE PROFILES              |      | USE TEMPERATURE GRADIENTS          |
| TEMPERATURE RATIO                 |      |                                    |
| TEMPERATURE SCALES                |      | TEMPERATURE DISTRIBUTION           |
| TEMPERATURE SENSORS               |      | 1408 2003 2204 2502 3303 3501      |
| TEPHIGRAMS                        |      | UF TEMPERATURE FIELDS              |
| THERMAL ABSORPTION                |      | GS DISTRIBUTION (PROPERTY)         |
| THERMAL ANALYSIS                  |      | #TEMPERATURE DISTRIBUTION          |
| THERMAL BLOOMING                  |      | RT AIR CONDITIONING                |
| THERMAL BOUNDARY LAYER            |      | COOLING                            |
| THERMAL BUCKLING                  |      | COOLING SYSTEMS                    |
| THERMAL COMFORT                   |      | ENVIRONMENTAL ENGINEERING          |
| THERMAL CONDUCTIVITY              |      | FIELD THEORY (PHYSICS)             |
| THERMAL CONDUCTIVITY GAGES        |      | HEAT TREATMENT                     |
| THERMAL CONDUCTORS                |      | HEATING                            |
| THERMAL CONTROL COATINGS          |      | ISOTHERMAL FLOW                    |
| THERMAL CYCLING TESTS             |      | ISOTHERMAL LAYERS                  |
| THERMAL DECOMPOSITION             |      | ISOTHERMS                          |
| THERMAL DEGRADATION               |      | OCEAN TEMPERATURE                  |
| THERMAL DIFFUSION                 |      | REFRIGERATING                      |
| THERMAL DIFFUSIVITY               |      | SATELLITE TEMPERATURE              |
| THERMAL DISSOCIATION              |      | TEMPERATURE                        |
| THERMAL EMISSION                  |      | THERMAL MAPPING                    |
| THERMAL ENERGY                    |      | THERMAL RESOURCES                  |
| THERMAL ENVIRONMENTS              |      | THERMAL SHOCK                      |
| THERMAL EXPANSION                 |      | THERMAL STRESSES                   |
| THERMAL FATIGUE                   |      | THERMOGRAPHY                       |
| THERMAL INSTABILITY               |      | VENTILATION                        |
| THERMAL INSULATION                |      | VERTICAL DISTRIBUTION              |
| THERMAL MAPPING                   |      | WATER TEMPERATURE                  |
| THERMAL NEUTRONS                  |      |                                    |
| THERMAL NOISE                     |      | TEMPERATURE EFFECTS                |
| THERMAL PLASMAS                   |      | 0101 0404 0603 1002 1308 1704 2003 |
| THERMAL POLLUTION                 |      | 2311                               |
| THERMAL PROTECTION                |      | UF                                 |
| THERMAL RADIATION                 |      | HEAT EFFECTS                       |
| THERMAL REACTORS                  |      | PHOTOTHERMOTROPISM                 |
| THERMAL RESISTANCE                |      | RICHARDSON-DUSHMAN EQUATION        |
| THERMAL RESOURCES                 |      | THERMAL EFFECTS                    |
| THERMAL SHOCK                     |      | THERMOTROPISM                      |
| THERMAL SIMULATION                |      | RT ABLATION                        |
| THERMAL STABILITY                 |      | ABSOLUTE ZERO                      |
| THERMAL STRESSES                  |      | CHEMICAL EFFECTS                   |
| THERMAL VACUUM TESTS              |      | % EFFECTS                          |
| TERMODYNAMIC EFFICIENCY           |      | ETTNGSHAUSEN EFFECT                |

# NASA THESAURUS HIERARCHICAL UPDATE

GLASS TRANSITION TEMPERATURE  
HEAT AFFECTED ZONE  
JET BLAST EFFECTS  
MAGNETIC EFFECTS  
NERNST-ETTINGSHAUSEN EFFECT  
PELTIER EFFECTS  
PRESSURE EFFECTS  
% RADIATION  
REENTRY EFFECTS  
SEEBECK EFFECT  
SHAPE MEMORY ALLOYS  
SOLAR GRANULATION  
STERILIZATION EFFECTS  
TEMPERATURE  
THERMAL BUCKLING  
THERMAL DEGRADATION  
THERMAL DISSOCIATION  
THERMAL RESISTANCE  
THERMAL STRESSES  
THERMOGRAVIMETRY  
THERMOLUMINESCENCE  
THERMOPHORESIS  
THERMOPLASTICITY  
TIME TEMPERATURE PARAMETER

TEMPERATURE FIELDS  
USE TEMPERATURE DISTRIBUTION

TEMPERATURE GRADIENTS  
1408 2003 3304 3501  
UF TEMPERATURE DIFFERENCES  
GS GRADIENTS  
#TEMPERATURE GRADIENTS  
..THERMOCLINES  
RT ATMOSPHERIC TEMPERATURE  
BATHYOTHERMOGRAPHS  
CHAPMAN-ENSKOG THEORY  
CONVECTIVE HEAT TRANSFER  
ISOTHERMAL LAYERS  
ISOTHERMS  
NONISOTHERMAL PROCESSES  
OCEAN TEMPERATURE  
POTENTIAL GRADIENTS  
STRATIFICATION  
TEMPERATURE  
THERMAL ANALYSIS  
THERMAL MAPPING  
THERMOMIGRATION  
THERMOPHORESIS

TEMPERATURE INDICATORS  
USE INDICATING INSTRUMENTS  
TEMPERATURE MEASURING INSTRUMENTS

TEMPERATURE INSTRUMENTS  
USE TEMPERATURE MEASURING INSTRUMENTS

TEMPERATURE INVERSIONS  
0408 1505 1704 2311 3203  
GS INVERSIONS  
#TEMPERATURE INVERSIONS

..CENTRIFUGING STRESS  
RT AIR POLLUTION  
ATMOSPHERIC TEMPERATURE  
BENDING  
BIREFRINGENCE  
BUCKLING  
CRACKING (FRACTURING)  
CRACKS  
CREEP PROPERTIES  
DEFLECTION  
DEFORMATION  
DISPLACEMENT  
DISTORTION  
FAILURE  
FATIGUE (MATERIALS)  
INTERNAL PRESSURE  
LAPSE RATE  
MECHANICAL PROPERTIES  
METEOROLOGICAL PARAMETERS

METEOROLOGY  
PHOTOELASTIC ANALYSIS  
PLASTIC DEFORMATION  
PRESSURE  
PRESSURE EFFECTS  
RESIDUAL STRESS  
SAINT VENANT PRINCIPLE  
SHEAR PROPERTIES  
SHRINKAGE  
STRAIN GAGES  
STRAIN HARDENING  
STRAIN RATE  
STRESS ANALYSIS  
STRESS RELAXATION  
STRESS WAVES  
STRESSES  
STRUCTURAL STRAIN  
TEMPERATURE  
TENSILE DEFORMATION  
% TENSION  
TEPHIGRAMS  
TORSION  
VOLUMETRIC STRAIN  
X RAY STRESS ANALYSIS  
YIELD STRENGTH

TEMPERATURE MEASUREMENT  
1408 2003 3501  
UF PYROMETRY

RT  
THERMOMETRY  
ANOMALOUS TEMPERATURE ZONES  
BOLOMETERS  
BRIGHTNESS TEMPERATURE  
CRAYONS  
GAS TEMPERATURE  
HIGH TEMPERATURE  
IN SITU MEASUREMENT  
% MEASUREMENT  
NOISE TEMPERATURE  
NONINTRUSIVE MEASUREMENT  
PYROMETERS  
RADIATION PYROMETERS  
RESISTANCE THERMOMETERS  
SATELLITE TEMPERATURE  
SODAR  
SOUND DETECTING AND RANGING  
TEMPERATURE  
THERMOCOUPLE PYROMETERS  
THERMOCOUPLES  
THERMOGRAPHY  
THERMOMETERS  
WIND TUNNEL CALIBRATION

TEMPERATURE MEASURING INSTRUMENTS  
1408 3501

UF TEMPERATURE INDICATORS  
TEMPERATURE INSTRUMENTS  
THERMOGRAMS

GS MEASURING INSTRUMENTS  
#TEMPERATURE MEASURING INSTRUMENTS  
..BATHYOTHERMOGRAPHS  
..OPTICAL PYROMETERS  
..PNEUMATIC PROBES  
..PYROMETERS  
...RADIATION PYROMETERS  
...THERMOCOUPLE PYROMETERS  
..TEMPERATURE PROBES  
..THERMOMETERS  
...RESISTANCE THERMOMETERS

RT ANOMALOUS TEMPERATURE ZONES  
BOLOMETERS  
BOMB CALORIMETERS  
CALORIMETERS  
DROP CALORIMETERS  
FLAME CALORIMETERS  
FLAME PROBES  
TEMPERATURE  
THERMISTORS  
THERMOCOUPLES  
THERMOPILES  
THERMOSTATS  
TRANSDUCERS

TEMPERATURE PROBES



# NASA THESAURUS HIERARCHICAL UPDATE

SHEAR STRENGTH  
% STRENGTH  
TOUGHNESS

TENSILE STRESS  
2308 3203  
GS STRESSES  
#TENSILE STRESS  
RT AXIAL STRESS  
HIGH STRENGTH  
HOOPS

INTERFACIAL TENSION  
STRESS INTENSITY FACTORS  
% TENSION  
TRIAXIAL STRESSES

TENSILE TESTS  
1108 1504 3203 3501  
RT DESTRUCTIVE TESTS  
FATIGUE TESTS  
LOAD TESTS  
SPECIMEN GEOMETRY  
STATIC TESTS  
% TESTS

TENSIO METERS  
1406 3203  
GS MEASURING INSTRUMENTS  
#TENSIO METERS  
RT CABLE FORCE RECORDERS  
MECHANICAL MEASUREMENT

% TENSION  
0408 1505 1704 2311 3203  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT BLOOD PRESSURE  
INTERFACIAL TENSION  
PARTIAL PRESSURE  
STRETCHING  
TEMPERATURE INVERSIONS  
TENSILE STRESS

TENSOMETERS  
0905 2307 2402 3203  
GS MEASURING INSTRUMENTS  
#TENSOMETERS  
RT DEFORMETERS  
EXTENSOMETERS  
STRAIN GAGES  
STRESS MEASUREMENT  
WEIGHT INDICATORS

TENSOR ANALYSIS

1902 2308 2311  
GS GEOMETRY  
.DIFFERENTIAL GEOMETRY  
.#TENSOR ANALYSIS  
RT RELATIVITY  
SCALARS  
SCALERS  
TENSORS

TENSOR FIELDS  
USE TENSORS

TENSORS  
1902 2311  
UF TENSOR FIELDS  
TRANSFORMATION TENSORS  
GS ALGEBRA  
#TENSORS  
.STRESS TENSORS  
RT FIELD THEORY (PHYSICS)  
JORDAN FORM  
SCALARS  
TENSOR ANALYSIS

TEPHIGRAMS  
1203 1408 2001 2003  
GS DIAGRAMS  
#TEPHIGRAMS  
RT ATMOSPHERIC TURBULENCE  
ENTROPY  
LAPSE RATE  
TEMPERATURE  
TEMPERATURE INVERSIONS  
THERMODYNAMIC PROPERTIES

TERBIUM  
0603 1703  
GS CHEMICAL ELEMENTS  
.RARE EARTH ELEMENTS  
.#TERBIUM  
...TERBIUM ISOTOPES  
METALS  
.RARE EARTH ELEMENTS  
.#TERBIUM  
...TERBIUM ISOTOPES  
RT TERBIUM COMPOUNDS

TERBIUM COMPOUNDS  
0603 1703  
GS RARE EARTH COMPOUNDS  
#TERBIUM COMPOUNDS  
RT TERBIUM

TERBIUM ISOTOPES  
0603 1703 2406

UF TERBIUM 155  
TERBIUM 161  
GS CHEMICAL ELEMENTS  
.NUCLIDES  
..ISOTOPES  
..#TERBIUM ISOTOPES  
.RARE EARTH ELEMENTS  
..TERBIUM  
..#TERBIUM ISOTOPES  
METALS  
.RARE EARTH ELEMENTS  
..TERBIUM  
..#TERBIUM ISOTOPES

TERBIUM 155  
USE TERBIUM ISOTOPES

TERBIUM 161  
USE TERBIUM ISOTOPES

TERCOM  
1402 2102 2103 2104  
UF TERRAIN CONTOUR MATCHING  
NAVIGATION SYSTEM  
GS NAVIGATION AIDS  
#TERCOM  
ONBOARD EQUIPMENT  
.AIRBORNE EQUIPMENT  
..#TERCOM  
.AIRCRAFT EQUIPMENT  
..#TERCOM

RT DISPLAY DEVICES  
FLIGHT INSTRUMENTS  
MAP MATCHING GUIDANCE  
NAVIGATION INSTRUMENTS  
% SYSTEMS  
VIDEO LANDMARK ACQUISITION AND  
TRACKING

TEREPHTHALATE  
1808 1810  
GS #TEREPHTHALATE  
.POLYETHYLENE TEREPHTHALATE  
RT CARBOXYLIC ACIDS  
DICARBOXYLIC ACIDS

TERMINAL AREA ENERGY MANAGEMENT  
3103  
GS MANAGEMENT  
#TERMINAL AREA ENERGY MANAGEMENT  
RT DIGITAL TECHNIQUES  
SPACE SHUTTLE ORBITERS  
SPACE TRANSPORTATION  
SPACECRAFT LANDING

TERMINAL BALLISTICS  
2311 3401  
UF PENETRATION BALLISTICS  
PROJECTILE PENETRATION  
TARGET PENETRATION  
GS BALLISTICS  
#TERMINAL BALLISTICS  
RT ENERGY TRANSFER  
FRAGMENTATION  
MISSILES  
PENETRATION  
PRECISION GUIDED PROJECTILES  
PROJECTILES

TERMINAL CONFIGURED VEHICLE PROGRAM  
0201  
UF TCV PROGRAM  
GS PROGRAMS  
.NASA PROGRAMS  
.#TERMINAL CONFIGURED VEHICLE  
PROGRAM  
RT AIRCRAFT DESIGN  
AUTOMATIC CONTROL  
AUTOMATIC FLIGHT CONTROL  
AUTOMATIC LANDING CONTROL  
ELECTRONIC CONTROL  
FEEDBACK CONTROL  
% VEHICLES

TERMINAL FACILITIES  
1102  
GS #TERMINAL FACILITIES  
.SHIP TERMINALS  
RT ARTIFICIAL HARBORS  
DEEPWATER TERMINALS  
% FACILITIES  
HARBORS  
OFFSHORE DOCKING  
OFFSHORE PLATFORMS  
SITE SELECTION  
TANKER TERMINALS  
% TERMINALS  
TRANSPORTATION  
WHARVES

TERMINAL GUIDANCE  
0802 2102 2103 3101  
GS GUIDANCE (MOTION)  
#TERMINAL GUIDANCE  
..LASER GUIDANCE  
RT COMMAND GUIDANCE  
DESCENT TRAJECTORIES  
ENTRY GUIDANCE (STS)  
GLIDE PATHS  
HOMING

INERTIAL GUIDANCE  
MIDCOURSE GUIDANCE  
REENTRY  
REENTRY GUIDANCE  
REENTRY TRAJECTORIES  
REENTRY VEHICLES  
RENDEZVOUS GUIDANCE  
SPACECRAFT GUIDANCE

TERMINAL VELOCITY  
2311 3009  
GS RATES (PER TIME)  
#TERMINAL VELOCITY  
VELOCITY  
#TERMINAL VELOCITY  
RT GRAVITATION

% TERMINALS  
0202 0303 0404 0507 0904 1504 2311  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT CONNECTORS  
DATA PROCESSING TERMINALS  
ELECTRIC TERMINALS  
% HEADERS  
JUMPERS  
OUTLETS  
SHIP TERMINALS  
TERMINAL FACILITIES

TERMINATING  
USE STOPPING

TERMINATOR LINES  
2306 3001  
RT % LINES  
LUNAR PHASES  
% PHASES  
SUNRISE  
SUNSET

TERMINOLOGY  
3405  
RT DICTIONARIES  
NOMENCLATURES  
THESAURI  
WORDS (LANGUAGE)

TERMS  
3402 3405 3406 3408  
RT INFORMATION THEORY  
THESAURI

TERNARY ALLOYS

1701 1704  
GS ALLOYS  
#TERNARY ALLOYS  
..ASTROLOY (TRADEMARK)  
RT ALLOYING

TERNARY SYSTEMS  
0603 0802 1701 1902 2405 2601  
RT ALLOYS  
BINARY SYSTEMS (MATERIALS)  
SOLID SOLUTIONS  
% SYSTEMS

TERNARY SYSTEMS (DIGITAL)  
USE DIGITAL SYSTEMS

TERPENES  
1808  
GS #TERPENES  
.AZULENE  
.CAMPHOR  
.MECAMYLAMINE  
.MENTHOL  
.TURPENTINE  
RT ALIPHATIC HYDROCARBONS  
ALKENES

TERPHENYLS  
1808 2403  
GS PHENYLS  
#TERPHENYLS

TERRACES (LANDFORMS)  
1305 1306  
GS LANDFORMS  
#TERRACES (LANDFORMS)  
..PLATEAUS  
...ALLEGHENY PLATEAU (US)  
...COLORADO PLATEAU (US)  
...MESAS  
...BUTTES  
...PIEDMONT  
...CENTRAL PIEDMONT (US)  
RT FORMATIONS  
MOUNTAINS

TERRADYNAMICS  
1308  
RT % DYNAMICS  
EARTH SURFACE  
GEODYNAMICS  
PROJECTILES  
SEA FLOOR SPREADING

TERRAFORMING



|      |      |                                            |                        |
|------|------|--------------------------------------------|------------------------|
| 1105 | 3109 | JET AIRCRAFT                               | PLANETARY RADIATION    |
| RT   |      | LIGHT AIRCRAFT                             | % RADIATION            |
|      |      | MILITARY AIRCRAFT                          | TROPOSPHERIC RADIATION |
|      |      | NAP-OF-THE-EARTH NAVIGATION                |                        |
|      |      | OBSERVATION AIRCRAFT                       |                        |
|      |      | % SUBSONIC AIRCRAFT                        |                        |
|      |      | UTILITY AIRCRAFT                           |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL DUST BELT                      |                        |
|      |      | 1301 1302 2003                             |                        |
|      |      | GS PARTICLES                               |                        |
|      |      | .DUST                                      |                        |
|      |      | .#TERRESTRIAL DUST BELT                    |                        |
|      |      | RT % BELTS                                 |                        |
|      |      | COSMIC DUST                                |                        |
|      |      | GEGENSCHEIN                                |                        |
|      |      | METEOROID DUST CLOUDS                      |                        |
|      |      | MICROMETEORIDS                             |                        |
|      |      | ZODIACAL DUST                              |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL MAGNETISM                      |                        |
|      |      | USE GEOMAGNETISM                           |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL PLANETS                        |                        |
|      |      | 3001                                       |                        |
|      |      | GS CELESTIAL BODIES                        |                        |
|      |      | .PLANETS                                   |                        |
|      |      | .#TERRESTRIAL PLANETS                      |                        |
|      |      | ...EARTH (PLANET)                          |                        |
|      |      | ...MARS (PLANET)                           |                        |
|      |      | ...MERCURY (PLANET)                        |                        |
|      |      | ...VENUS (PLANET)                          |                        |
|      |      | CELESTIAL MECHANICS                        |                        |
|      |      | MERCURY SURFACE                            |                        |
|      |      | PLANETARY ENVIRONMENTS                     |                        |
|      |      | PLANETOLOGY                                |                        |
|      |      | SOLAR SYSTEM                               |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL RADIATION                      |                        |
|      |      | 1306 2402 2903                             |                        |
|      |      | SN (EXCLUDES ATMOSPHERIC RADIATION         |                        |
|      |      | AND REFLECTED VISIBLE LIGHT)               |                        |
|      |      | UF EARTH RADIATION                         |                        |
|      |      | GS ELECTROMAGNETIC RADIATION               |                        |
|      |      | #TERRESTRIAL RADIATION                     |                        |
|      |      | ATMOSPHERIC RADIATION                      |                        |
|      |      | RT EARTH (PLANET)                          |                        |
|      |      | EARTH ALBEDO                               |                        |
|      |      | EARTH RADIATION BUDGET                     |                        |
|      |      | EARTH RADIATION BUDGET EXPERIMENT          |                        |
|      |      | EXTRATERRESTRIAL RADIATION                 |                        |
|      |      | FAR INFRARED RADIATION                     |                        |
|      |      | GREENHOUSE EFFECT                          |                        |
|      |      | INFRARED RADIATION                         |                        |
|      |      | NEAR INFRARED RADIATION                    |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL ANALYSIS                       |                        |
|      |      | 1303 1304 1305 3009                        |                        |
|      |      | UF SATAN (SENSOR)                          |                        |
|      |      | RT % ANALYZING                             |                        |
|      |      | CHANGE DETECTION                           |                        |
|      |      | EARTH RESOURCES                            |                        |
|      |      | EROS (SATELLITES)                          |                        |
|      |      | GEOGRAPHIC APPLICATIONS PROGRAM            |                        |
|      |      | HOLOGRAMMETRY                              |                        |
|      |      | MAPPING                                    |                        |
|      |      | NAP-OF-THE-EARTH NAVIGATION                |                        |
|      |      | PHOTOGRAMMETRY                             |                        |
|      |      | RECONNAISSANCE                             |                        |
|      |      | SATELLITE SURFACES                         |                        |
|      |      | SOIL MAPPING                               |                        |
|      |      | VIDEO LANDMARK ACQUISITION AND             |                        |
|      |      | TRACKING                                   |                        |
|      |      |                                            |                        |
|      |      | TERRAIN CONTOUR MATCHING NAVIGATION SYSTEM |                        |
|      |      | USE TERCOM                                 |                        |
|      |      |                                            |                        |
|      |      | TERRAIN FOLLOWING AIRCRAFT                 |                        |
|      |      | 0201 0207 2103                             |                        |
|      |      | GS #TERRAIN FOLLOWING AIRCRAFT             |                        |
|      |      | .TSR-2 AIRCRAFT                            |                        |
|      |      | AH-1G HELICOPTER                           |                        |
|      |      | AH-63 HELICOPTER                           |                        |
|      |      | AH-64 HELICOPTER                           |                        |
|      |      | % AIRCRAFT                                 |                        |
|      |      | ATTACK AIRCRAFT                            |                        |
|      |      |                                            |                        |
|      |      | JET AIRCRAFT                               |                        |
|      |      | LIGHT AIRCRAFT                             |                        |
|      |      | MILITARY AIRCRAFT                          |                        |
|      |      | NAP-OF-THE-EARTH NAVIGATION                |                        |
|      |      | OBSERVATION AIRCRAFT                       |                        |
|      |      | % SUBSONIC AIRCRAFT                        |                        |
|      |      | UTILITY AIRCRAFT                           |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL DUST BELT                      |                        |
|      |      | 1301 1302 2003                             |                        |
|      |      | GS PARTICLES                               |                        |
|      |      | .DUST                                      |                        |
|      |      | .#TERRESTRIAL DUST BELT                    |                        |
|      |      | RT % BELTS                                 |                        |
|      |      | COSMIC DUST                                |                        |
|      |      | GEGENSCHEIN                                |                        |
|      |      | METEOROID DUST CLOUDS                      |                        |
|      |      | MICROMETEORIDS                             |                        |
|      |      | ZODIACAL DUST                              |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL MAGNETISM                      |                        |
|      |      | USE GEOMAGNETISM                           |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL PLANETS                        |                        |
|      |      | 3001                                       |                        |
|      |      | GS CELESTIAL BODIES                        |                        |
|      |      | .PLANETS                                   |                        |
|      |      | .#TERRESTRIAL PLANETS                      |                        |
|      |      | ...EARTH (PLANET)                          |                        |
|      |      | ...MARS (PLANET)                           |                        |
|      |      | ...MERCURY (PLANET)                        |                        |
|      |      | ...VENUS (PLANET)                          |                        |
|      |      | CELESTIAL MECHANICS                        |                        |
|      |      | MERCURY SURFACE                            |                        |
|      |      | PLANETARY ENVIRONMENTS                     |                        |
|      |      | PLANETOLOGY                                |                        |
|      |      | SOLAR SYSTEM                               |                        |
|      |      |                                            |                        |
|      |      | TERRESTRIAL RADIATION                      |                        |
|      |      | 1306 2402 2903                             |                        |
|      |      | SN (EXCLUDES ATMOSPHERIC RADIATION         |                        |
|      |      | AND REFLECTED VISIBLE LIGHT)               |                        |
|      |      | UF EARTH RADIATION                         |                        |
|      |      | GS ELECTROMAGNETIC RADIATION               |                        |
|      |      | #TERRESTRIAL RADIATION                     |                        |
|      |      | ATMOSPHERIC RADIATION                      |                        |
|      |      | RT EARTH (PLANET)                          |                        |
|      |      | EARTH ALBEDO                               |                        |
|      |      | EARTH RADIATION BUDGET                     |                        |
|      |      | EARTH RADIATION BUDGET EXPERIMENT          |                        |
|      |      | EXTRATERRESTRIAL RADIATION                 |                        |
|      |      | FAR INFRARED RADIATION                     |                        |
|      |      | GREENHOUSE EFFECT                          |                        |
|      |      | INFRARED RADIATION                         |                        |
|      |      |                                            |                        |

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THERMAL VACUUM TESTS
VACUUM TESTS
WIND TUNNELS

% TEST EQUIPMENT
1106 1108 1110 1504 3404 3501
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
UF CHECKOUT EQUIPMENT
TESTERS
TESTING MACHINES
RT ANALYZERS
ASTRONICS
AUTOMATIC TEST EQUIPMENT
AVIONICS
% CAPSULES
CEFOAM CHECKOUT EQUIPMENT
CENTRIFUGES
CHECKOUT
DYNAMOMETERS
EARTH TERMINAL MEASUREMENT SYSTEM
ELECTRONIC EQUIPMENT TESTS
% EQUIPMENT
FATIGUE TESTING MACHINES
FREE FLIGHT TEST APPARATUS
FREQUENCY ANALYZERS
GEOPHYSICAL FLUID FLOW CELLS
GROUND SUPPORT EQUIPMENT
HYPERSONIC TEST APPARATUS
IMPACT TESTING MACHINES
LOAD TESTING MACHINES
MEASURING INSTRUMENTS
MONOSCOPES
ONBOARD EQUIPMENT
ROCKET PROPELLED SLEDS
SAMPLERS
SIMULATORS
SUPERSONIC TEST APPARATUS
TEST FACILITIES
TEST PATTERN GENERATORS
TEST STANDS
WIND TUNNEL MODELS
WIND TUNNELS

TEST FACILITIES
1108 1110 3501
GS #TEST FACILITIES
.ANECHOIC CHAMBERS
.CENTRAL ATLANTIC REGIONAL ECOL
TEST SITE
.ENGINE TESTING LABORATORIES
.ENVIRONMENTAL LABORATORIES
.HYDRAULIC TEST TUNNELS
.REVERBERATION CHAMBERS

.ROCKET TEST FACILITIES
.TEST RANGES
..BALLISTIC RANGES
..MISSILE RANGES
.TEST STANDS
.TRANSIENT REACTOR TEST FACILITY
.WIND TUNNELS
..BLOWDOWN WIND TUNNELS
..COMBUSTION WIND TUNNELS
..CRYOGENIC WIND TUNNELS
..HYPERSONIC WIND TUNNELS
...CASCADE WIND TUNNELS
...HOTSHOT WIND TUNNELS
...PLASMA JET WIND TUNNELS
...SHOCK TUNNELS
..HYPERVELOCITY WIND TUNNELS
...CASCADE WIND TUNNELS
...HOTSHOT WIND TUNNELS
...PLASMA JET WIND TUNNELS
...SHOCK TUNNELS
..LOW DENSITY WIND TUNNELS
..LOW SPEED WIND TUNNELS
..SUBSONIC WIND TUNNELS
..RECTANGULAR WIND TUNNELS
..SLOTTED WIND TUNNELS
..SUPERSONIC WIND TUNNELS
..TRANSONIC WIND TUNNELS
..TRISONIC WIND TUNNELS
RT ARIZONA REGIONAL ECOLOGICAL TEST
SITE
% FACILITIES
FLIGHT SIMULATORS
LABORATORIES
MODELS
MOTION SIMULATORS
RESEARCH FACILITIES
SHOCK TUBES
SIMULATORS
SOLAR SIMULATORS
SPACECRAFT CABIN SIMULATORS
% TEST EQUIPMENT
% TESTS

TEST FIRING
1108 3301 3501
GS FIRING (IGNITING)
#TEST FIRING
..STATIC FIRING
RT ENGINE TESTS
FUEL TESTS
GROUND TESTS
MISSILE TESTS
PREFIRING TESTS
PRELAUNCH TESTS
ROCKET FIRING

TEST FACILITIES
1106 1108 1504 3501
UF TEST BEDS
GS TEST FACILITIES
#TEST STANDS
RT ENGINE TESTS
FLAME DEFLECTORS
PREFIRING TESTS
PRELAUNCH TESTS
ROCKET TEST FACILITIES
% TEST EQUIPMENT

TEST STANDS
1106 1108 1504 3501
UF TEST BEDS
GS TEST FACILITIES
#TEST STANDS
RT ENGINE TESTS
FLAME DEFLECTORS
PREFIRING TESTS
PRELAUNCH TESTS
ROCKET TEST FACILITIES
% TEST EQUIPMENT

TEST VEHICLES
0201 1108 3110 3501
GS #TEST VEHICLES
.FLIGHT TEST VEHICLES

ROCKET TEST FACILITIES
STATIC TESTS
% TESTS

TEST PATTERN GENERATORS
0602
RT % FAULTS
% GENERATORS
% PATTERNS
% TEST EQUIPMENT

TEST PILOTS
0201 0502 1108 3401 3501
GS PERSONNEL
.FLYING PERSONNEL
..PILOTS (PERSONNEL)
...AIRCRAFT PILOTS
...#TEST PILOTS
.OPERATORS (PERSONNEL)
..PILOTS (PERSONNEL)
...AIRCRAFT PILOTS
...#TEST PILOTS
RT % PILOTS

TEST RANGES
1108 3501
GS RANGES (FACILITIES)
#TEST RANGES
..BALLISTIC RANGES
..MISSILE RANGES
TEST FACILITIES
#TEST RANGES
..BALLISTIC RANGES
..MISSILE RANGES
RT DOWNRANGE
DOWNRANGE MEASUREMENT
RANGE SAFETY
ROCKET TEST FACILITIES

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# NASA THESAURUS HIERARCHICAL UPDATE

|                     |                         |      |                                  |      |      |         |                                     |
|---------------------|-------------------------|------|----------------------------------|------|------|---------|-------------------------------------|
| RT                  | % AIRCRAFT              | 1108 | 1505                             | 3406 | 3501 | % TESTS | LOW TEMPERATURE TESTS               |
|                     | ALTITUDE TESTS          |      |                                  |      |      |         | LUBRICANT TESTS                     |
|                     | % BALLISTIC VEHICLES    | SN   | (USE OF A MORE SPECIFIC TERM IS  |      |      |         | MATERIALS TESTS                     |
|                     | % CAPSULES              |      | RECOMMENDED--CONSULT THE TERMS   |      |      |         | MEDIAN (STATISTICS)                 |
|                     | ELECTRIC MOTOR VEHICLES |      | LISTED BELOW)                    |      |      |         | MISSILE TESTS                       |
|                     | HIGH ALTITUDE TESTS     | UF   | PRETESTS                         |      |      |         | NONDESTRUCTIVE TESTS                |
|                     | HYPERSONIC VEHICLES     |      | TESTING                          |      |      |         | NOTCH TESTS                         |
|                     | LAUNCH VEHICLES         |      | ACCELERATED LIFE TESTS           |      |      |         | ORBITAL SPACE TESTS                 |
|                     | MISSILE TESTS           | RT   | ACCEPTABILITY                    |      |      |         | PATCH TESTS                         |
|                     | MISSILES                |      | ACCURACY                         |      |      |         | PERFORMANCE TESTS                   |
|                     | REENTRY VEHICLES        |      | ADHESION TESTS                   |      |      |         | PERSONALITY TESTS                   |
|                     | RESEARCH AIRCRAFT       |      | ALTITUDE TESTS                   |      |      |         | PHYSIOLOGICAL TESTS                 |
|                     | ROCKET VEHICLES         |      | APPROACH AND LANDING TESTS (STS) |      |      |         | PREFIRING TESTS                     |
|                     | % SPACECRAFT            |      | BEND TESTS                       |      |      |         | PREFLIGHT ANALYSIS                  |
|                     | % TESTS                 |      | CAPTIVE TESTS                    |      |      |         | PRELAUNCH TESTS                     |
|                     | TOWED BODIES            |      | CHECKOUT                         |      |      |         | PROGRAM VERIFICATION (COMPUTERS)    |
|                     | % VEHICLES              |      | CHEMICAL ANALYSIS                |      |      |         | PROPELLANT TESTS                    |
|                     |                         |      | CHEMICAL TESTS                   |      |      |         | PROVING                             |
| TESTERS             |                         |      | COLD FLOW TESTS                  |      |      |         | PSYCHOLOGICAL TESTS                 |
| USE                 | TEST EQUIPMENT          |      | COLD WEATHER TESTS               |      |      |         | QUALIFICATIONS                      |
| TESTES              |                         |      | COMPRESSION TESTS                |      |      |         | QUALITY                             |
| O404                | O405 O408               |      | COMPUTATIONAL CHEMISTRY          |      |      |         | QUALITY CONTROL                     |
| GS                  | ANATOMY                 |      | CONFIDENCE LIMITS                |      |      |         | RAILROAD HUMMING TESTS              |
|                     | .GENITOURINARY SYSTEM   |      | CORROSION TEST LOOPS             |      |      |         | RANK TESTS                          |
|                     | ..REPRODUCTIVE SYSTEMS  |      | CORROSION TESTS                  |      |      |         | REACTOR STARTUP TESTS               |
|                     | ...SEX GLANDS           |      | CREP TESTS                       |      |      |         | RECORDS                             |
|                     | ....GONADS              |      | CREW PROCEDURES (INFLIGHT)       |      |      |         | RELIABILITY                         |
|                     | .....#TESTES            |      | CREW PROCEDURES (PREFLIGHT)      |      |      |         | RESONANCE TESTING                   |
|                     | .GLANDS (ANATOMY)       |      | DAMPING TESTS                    |      |      |         | RORSCHACH TESTS                     |
|                     | ..ENDOCRINE GLANDS      |      | DESTRUCTIVE TESTS                |      |      |         | SALT SPRAY TESTS                    |
|                     | ...GONADS               |      | DROP TESTS                       |      |      |         | SAMPLING                            |
|                     | ....#TESTES             |      | DYNAMIC TESTS                    |      |      |         | SELECTION                           |
|                     | ...SEX GLANDS           |      | EDUCATION                        |      |      |         | SELF TESTS                          |
|                     | ....GONADS              |      | ELECTRIC EQUIPMENT TESTS         |      |      |         | SHOCK TESTS                         |
|                     | .....#TESTES            |      | ELECTRONIC EQUIPMENT TESTS       |      |      |         | SNELLEN TESTS                       |
| TESTING             |                         |      | EMPLOYMENT                       |      |      |         | SPACE ELECTRIC ROCKET TESTS         |
| USE                 | TESTS                   |      | ENGINE TESTS                     |      |      |         | SPACE TRANSPORTATION SYSTEM FLIGHTS |
| TESTING MACHINES    |                         |      | ENVIRONMENTAL TESTS              |      |      |         | SPACE VEHICLE CHECKOUT PROGRAM      |
| USE                 | TEST EQUIPMENT          |      | ERRORS                           |      |      |         | SPIN TESTS                          |
| TESTING TIME        |                         |      | EVALUATION                       |      |      |         | STABILITY TESTS                     |
| 1108 1406           |                         |      | EXAMINATION                      |      |      |         | STATIC TESTS                        |
| GS                  | TIME                    |      | EXTRAPOLATION                    |      |      |         | STATISTICAL TESTS                   |
| RT                  | #TESTING TIME           |      | FATIGUE TESTS                    |      |      |         | STROKING TESTS                      |
| BURNING TIME        |                         |      | FLIGHT STABILITY TESTS           |      |      |         | TASKS                               |
| ENGINE TESTS        |                         |      | FLIGHT TESTS                     |      |      |         | TENSILE TESTS                       |
| FATIGUE TESTS       |                         |      | FUEL TESTS                       |      |      |         | TEST FACILITIES                     |
| FLIGHT TIME         |                         |      | FULL SCALE TESTS                 |      |      |         | TEST FIRING                         |
| % TESTS             |                         |      | GROUND TESTS                     |      |      |         | TEST VEHICLES                       |
| TURNAROUND (STS)    |                         |      | HARDNESS TESTS                   |      |      |         | TESTING TIME                        |
| WINDOWS (INTERVALS) |                         |      | HIGH ALTITUDE TESTS              |      |      |         | THERMAL CYCLING TESTS               |
|                     |                         |      | HIGH TEMPERATURE TESTS           |      |      |         | THERMAL VACUUM TESTS                |
|                     |                         |      | IMPACT TESTS                     |      |      |         | ULTRASONIC TESTS                    |
|                     |                         |      | INTELLIGENCE TESTS               |      |      |         | VACUUM TESTS                        |
|                     |                         |      | LABORATORIES                     |      |      |         | VIBRATION TESTS                     |
|                     |                         |      | LOAD TESTS                       |      |      |         | WATER TUNNEL TESTS                  |

WEAR TESTS  
WELD TESTS  
WIND TUNNEL STABILITY TESTS  
WIND TUNNEL TESTS  
WING FLOW METHOD TESTS  
X RAY INSPECTION

TETHERED BALLOONS  
0205  
UF KITE BALLOONS  
GS EXPANDABLE STRUCTURES  
.INFLATABLE STRUCTURES  
..BALLOONS  
..#TETHERED BALLOONS  
RT METEOROLOGICAL BALLOONS  
REELS

TETHERED SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
#TETHERED SATELLITES  
RT REELS

TETHERING  
3104 3109  
RT ORBITAL RENDEZVOUS  
REELS  
TETHERLINES

TETHERLINES  
3104 3109  
RT ANCHORS (FASTENERS)  
% CABLES  
% LINES  
TETHERING  
UMBILICAL CONNECTORS

TETHYS  
3008  
GS CELESTIAL BODIES  
.NATURAL SATELLITES  
..ICY SATELLITES  
..#TETHYS  
..SATURN SATELLITES  
..#TETHYS  
RT SATURN (PLANET)

TETRABUTYLS  
0603 1808  
GS ALKYL COMPOUNDS  
#TETRABUTYLS  
RT DIBUTYL COMPOUNDS  
ORGANOMETALLIC COMPOUNDS

TETRACHLORIDES  
1808  
GS HALOGEN COMPOUNDS  
.CHLORINE COMPOUNDS  
..CHLORIDES  
..#TETRACHLORIDES  
.HALIDES  
..CHLORIDES  
..#TETRACHLORIDES

TETRACHLOROMETHANE  
USE CARBON TETRACHLORIDE

TETRACYCLINES  
0603 1808  
GS DRUGS  
.ANTIBIOTICS  
..#TETRACYCLINES  
ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
..HETEROCYCLIC COMPOUNDS  
..#TETRACYCLINES

TETRAD THEORY  
0404 0406  
RT CHROMOSOMES  
MIOSIS  
SPORES  
% THEORIES

TETRAETHYL ORTHOCARBONATES  
0603 1808  
GS CARBON COMPOUNDS  
.CARBONATES  
..#TETRAETHYL ORTHOCARBONATES

TETRAETHYL ORTHOSILICATE  
0603  
GS ADHESIVES  
#TETRAETHYL ORTHOSILICATE  
RT ETHYL COMPOUNDS  
GLUES  
SILICATES

TETRAFLUOROHYDRAZINE  
1808  
GS AMINES  
#TETRAFLUOROHYDRAZINE  
HALOGEN COMPOUNDS  
.FLUORINE COMPOUNDS  
..FLUORO COMPOUNDS  
..#TETRAFLUOROHYDRAZINE  
HYDRAZINES  
#TETRAFLUOROHYDRAZINE  
RT ROCKET OXIDIZERS

TETRAHEDRONS  
1902 2601 3203  
GS GEOMETRY  
.EUCLIDEAN GEOMETRY  
..POLYGONS  
..#TETRAHEDRONS  
..PARALLELOGRAMS  
....RHOMBOIDS  
....RECTANGLES  
....SQUARES (MATHEMATICS)  
....TRAPEZOIDS

TETRAHYDROFURAN  
1701  
UF BUTYLENE OXIDES  
GS ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
..HETEROCYCLIC COMPOUNDS  
...FURANS  
...#TETRAHYDROFURAN  
SOLVENTS  
#TETRAHYDROFURAN  
RT ADDITIVES  
% CHEMICAL COMPOUNDS  
PLASTICS  
POLYVINYL CHLORIDE

TETRAITROTETRAZACYCLOOCTANE  
USE HMX

TETRAPHENYLS  
1808  
GS PHENYLS  
.POLYPHENYLS  
..#TETRAPHENYLS

TETRAZOLES  
1808  
GS ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
..HETEROCYCLIC COMPOUNDS  
..#TETRAZOLES

TETRODES  
0903 0905 1002  
RT ELECTRON TUBES  
PENTODES

# NASA THESAURUS HIERARCHICAL UPDATE

SEMICONDUCTOR DEVICES  
TRANSISTORS  
TRIODES

TETROONS  
USE SUPERPRESSURE BALLOONS

TETRYL  
O603 1808  
GS AMINES  
#TETRYL  
EXPLOSIVES  
#TETRYL  
NITROGEN COMPOUNDS  
.NITRO COMPOUNDS  
.#TETRYL  
PROPELLANTS  
#TETRYL

TEXAS  
1305  
GS NATIONS  
.UNITED STATES  
.#TEXAS  
GULF OF MEXICO  
HOUSTON (TX)  
LAKE TEXOMA (OK-TX)  
RIO GRANDE (NORTH AMERICA)

TEXTBOOKS  
O502 3405  
GS DOCUMENTS  
#TEXTBOOKS  
RT EDUCATION  
HANDBOOKS  
KNOWLEDGE  
LEARNING  
LIBRARIES  
MANUALS  
SUBJECTS

TEXTILES  
1811  
GS #TEXTILES  
.COTTON FIBERS  
.LINEN  
.RAYON  
RT CLOTHING  
COTTON  
FABRICS  
FIBERS  
VAPOR BARRIER CLOTHING  
WET SPINNING

TEXTS

O803 3405  
GS DOCUMENTS  
#TEXTS  
RT FORMAT  
RECORDS

TEXTURES  
3403 3408  
RT CURL (MATERIALS)  
FINENESS  
MECHANICAL PROPERTIES  
POROSITY  
SURFACE PROPERTIES

TF-30 ENGINE  
O202 2801 2805  
GS AIRCRAFT ENGINES  
#TF-30 ENGINE  
ENGINES

.INTERNAL COMBUSTION ENGINES  
..GAS TURBINE ENGINES  
...JET ENGINES  
...TURBOJET ENGINES  
...TURBOFAN ENGINES  
...#TF-30 ENGINE  
.TURBINE ENGINES  
..GAS TURBINE ENGINES  
...JET ENGINES  
...TURBOJET ENGINES  
...TURBOFAN ENGINES  
...#TF-30 ENGINE

TF-34 ENGINE  
O202 2801 2805  
GS AIRCRAFT ENGINES  
#TF-34 ENGINE  
RT CONVERTIBLE FAN-SHAFT ENGINES

TF-41 ENGINE  
O301  
GS AIRCRAFT ENGINES  
#TF-41 ENGINE  
ENGINES  
.AIR BREATHING ENGINES  
..GAS TURBINE ENGINES  
...JET ENGINES  
...TURBOJET ENGINES  
...TURBOFAN ENGINES  
...#TF-41 ENGINE  
.INTERNAL COMBUSTION ENGINES  
..GAS TURBINE ENGINES  
...JET ENGINES  
...TURBOJET ENGINES  
...TURBOFAN ENGINES  
...#TF-41 ENGINE

.TURBINE ENGINES  
..GAS TURBINE ENGINES  
...JET ENGINES  
...TURBOJET ENGINES  
...TURBOFAN ENGINES  
...#TF-41 ENGINE

TFX AIRCRAFT  
USE F-111 AIRCRAFT

TH-55 HELICOPTER  
O206 O207  
GS HUGHES AIRCRAFT  
#TH-55 HELICOPTER  
V/STOL AIRCRAFT  
.ROTARY WING AIRCRAFT  
..HELICOPTERS  
...#TH-55 HELICOPTER

THAILAND  
1305  
GS NATIONS  
#THAILAND  
RT ASIA

THALAMUS  
O405 O408  
GS ANATOMY  
.NERVOUS SYSTEM  
..CENTRAL NERVOUS SYSTEM  
...BRAIN  
...DIENCEPHALON  
...#THALAMUS

THALLIUM  
O603 1703  
GS CHEMICAL ELEMENTS  
#THALLIUM  
..THALLIUM ISOTOPES  
METALS  
#THALLIUM  
..THALLIUM ISOTOPES  
RT THALLIUM COMPOUNDS

THALLIUM ALLOYS  
1701  
GS ALLOYS  
#THALLIUM ALLOYS

THALLIUM COMPOUNDS  
O603 1704 1804  
RT % METAL COMPOUNDS  
THALLIUM

THALLIUM ISOTOPES

0603 1703  
 GS CHEMICAL ELEMENTS  
 .THALLIUM  
 .#THALLIUM ISOTOPES  
 METALS  
 .THALLIUM  
 .#THALLIUM ISOTOPES

THAWING  
 USE MELTING

THEMATIC MAPPERS (LANDSAT)  
 0705 0905 1303 1406 1407 1409  
 GS OPTICAL EQUIPMENT  
 .OPTICAL SCANNERS  
 ..MULTISPECTRAL BAND SCANNERS  
 ..#THEMATIC MAPPERS (LANDSAT)  
 REMOTE SENSORS  
 #THEMATIC MAPPERS (LANDSAT)  
 SCANNERS  
 .OPTICAL SCANNERS  
 ..MULTISPECTRAL BAND SCANNERS  
 ..#THEMATIC MAPPERS (LANDSAT)

RT LANDSAT 4  
 LANDSAT 5  
 REMOTE SENSING  
 THEMATIC MAPPING

THEMATIC MAPPING  
 1303  
 GS MAPPING  
 #THEMATIC MAPPING  
 RT CADASTRAL MAPPING  
 MAPS  
 PHOTO GEOLOGY  
 PHOTOMAPPING  
 PHOTOMAPS  
 THEMATIC MAPPERS (LANDSAT)

THEMIS PROJECT  
 1902 1903  
 GS PROGRAMS  
 .PROJECTS  
 .#THEMIS PROJECT

THEODOLITES  
 1406 1412 1901 2104 3001 3002  
 GS MEASURING INSTRUMENTS  
 .OPTICAL MEASURING INSTRUMENTS  
 ..TRANSITS  
 ..#THEODOLITES  
 ....CINETHEODOLITES  
 OPTICAL EQUIPMENT  
 .OPTICAL MEASURING INSTRUMENTS  
 ..TRANSITS

...#THEODOLITES  
 ....CINETHEODOLITES  
 RT SEXTANTS

THEODORSEN TRANSFORMATION  
 0101 0102 1202  
 RT AIRFOIL PROFILES  
 COMPLEX VARIABLES  
 CONFORMAL MAPPING  
 COORDINATE TRANSFORMATIONS  
 JOKOWSKI TRANSFORMATION  
 PRESSURE DISTRIBUTION

THEOREM PROVING  
 1902  
 GS PROBLEM SOLVING  
 #THEOREM PROVING  
 PROVING  
 #THEOREM PROVING  
 RT ARTIFICIAL INTELLIGENCE  
 COMPUTER PROGRAMMING  
 PREDICATE CALCULUS  
 THEOREMS

THEOREMS  
 1902 2311  
 UF LEMMAS  
 GS #THEOREMS  
 .ADDITION THEOREM  
 .BAYES THEOREM  
 .BERNOULLI THEOREM  
 .BINOMIAL THEOREM  
 .CASTIGLIANO VARIATIONAL THEOREM  
 .DUALITY THEOREM  
 .EQUIPARTITION THEOREM  
 .EXISTENCE THEOREMS  
 .FLOQUET THEOREM  
 .GAUSS-MARKOV THEOREM  
 .HELLMANN-FEYNMAN THEOREM  
 .KAKUTANI THEOREM  
 .LEBESGUE THEOREM  
 .LIOUVILLE THEOREM  
 .MICHELL THEOREM  
 .POMERANCHUK THEOREM  
 .POYNTING THEOREM  
 .RECIPROCAL THEOREMS  
 .RECIPROCITY THEOREM  
 .RICHARDS THEOREM  
 .RIESZ THEOREM  
 .SCHAUDER FIXPOINT THEOREM  
 .SIMILARITY THEOREM  
 ..LAGRANGE SIMILARITY HYPOTHESIS  
 .STOKES THEOREM (VECTOR CALCULUS)  
 .UNIQUENESS THEOREM  
 .VIRIAL THEOREM

RT HYPOTHESES  
 MATHEMATICAL LOGIC  
 % MATHEMATICS  
 TAYLOR SERIES  
 THEOREM PROVING

THEORETICAL PHYSICS  
 2311  
 GS #THEORETICAL PHYSICS  
 .NEWTON THEORY  
 .QUANTUM THEORY  
 ..BOHR THEORY  
 ASTROPHYSICS  
 BROKEN SYMMETRY  
 CHARM (PARTICLE PHYSICS)  
 ELECTROPHYSICS  
 FLAVOR (PARTICLE PHYSICS)  
 GEOPHYSICS  
 GRAND UNIFIED THEORY  
 NAKED SINGULARITIES  
 NUCLEAR PHYSICS  
 % PHYSICS  
 PLASMA PHYSICS  
 RADIO PHYSICS  
 % SCIENCE  
 % SOLID STATE PHYSICS  
 STRANGE ATTRACTORS  
 STRING THEORY  
 SUPERGRAVITY  
 SUPERSYMMETRY  
 UNIFIED FIELD THEORY  
 YANG-MILLS THEORY

% THEORIES  
 1902 3406  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ABRIKOSOV THEORY  
 ASSUMPTIONS  
 ATOMIC THEORY  
 AUTOMATA THEORY  
 BCS THEORY  
 BELLMAN THEORY  
 BENDING THEORY  
 BESSEL-BREDICHIN THEORY  
 BIMETRIC THEORIES  
 BOGOLIUBOV THEORY  
 BOHR THEORY  
 BORN-INFELD THEORY  
 CATASTROPHE THEORY  
 CHAPMAN-ENSKOG THEORY  
 COMMUNICATION THEORY  
 CONTROL THEORY  
 CROCCO-LEE THEORY

[illegible]

GS BUCKLING  
 #THERMAL BUCKLING  
 RT EXPANSION  
 TEMPERATURE EFFECTS  
 THERMAL EXPANSION  
 THERMAL COMFORT  
 O504 0507 0508 3303  
 RT HEAT STROKE  
 TEMPERATURE  
 THERMAL ENVIRONMENTS  
 THERMAL CONDUCTIVITY  
 2302 3303 3304 3408 3501  
 GS THERMODYNAMIC PROPERTIES  
 .THERMOPHYSICAL PROPERTIES  
 .#THERMAL CONDUCTIVITY  
 TRANSPORT PROPERTIES  
 #THERMAL CONDUCTIVITY  
 RT AIR CONDUCTIVITY  
 ATMOSPHERIC CONDUCTIVITY  
 CONDUCTIVE HEAT TRANSFER  
 % CONDUCTIVITY  
 FOURIER LAW  
 HOT-WIRE FLOWMETERS  
 LEWIS NUMBERS  
 SPECIFIC HEAT  
 TEMPERATURE  
 THERMOHYDRAULICS  
 THERMAL CONDUCTIVITY GAGES  
 1406 1408 2302 3303 3501  
 SN (GAGES FOR MEASURING THERMAL  
 CONDUCTIVITY--EXCLUDES GAGES USING  
 THERMAL CONDUCTIVITY TO MEASURE  
 OTHER PROPERTIES OR VARIABLES)  
 GS MEASURING INSTRUMENTS  
 #THERMAL CONDUCTIVITY GAGES  
 RT TEMPERATURE  
 THERMAL CONDUCTORS  
 O603 1704 2302 3303 3304 3501  
 GS CONDUCTORS  
 #THERMAL CONDUCTORS  
 RT % CONDUCTION  
 CONDUCTIVE HEAT TRANSFER  
 ELECTRIC CONDUCTORS  
 TEMPERATURE  
 THERMAL CONTROL COATINGS  
 O604 1802 3303 3305 3501  
 GS COATINGS  
 #THERMAL CONTROL COATINGS  
 RT ABLATIVE MATERIALS  
 % CONTROL  
 HEAT SHIELDING  
 REENTRY SHIELDING  
 REUSABLE HEAT SHIELDING  
 TEMPERATURE  
 TEMPERATURE CONTROL  
 THERMAL CONVECTION  
 USE FREE CONVECTION  
 THERMAL CURRENTS  
 USE CONVECTIVE FLOW  
 THERMAL CYCLING TESTS  
 3303 3304 3501  
 RT CLOSED CYCLES  
 COOLING  
 ENVIRONMENTAL TESTS  
 FATIGUE TESTS  
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 TEMPERATURE CONTROL  
 % TESTS  
 THERMODYNAMIC PROPERTIES  
 THERMAL DECOMPOSITION  
 O602  
 GS CHEMICAL REACTIONS  
 #THERMAL DECOMPOSITION  
 ..PYROLYSIS  
 DECOMPOSITION  
 #THERMAL DECOMPOSITION  
 ..PYROLYSIS  
 RT ABLATION  
 ENDOTHERMIC REACTIONS  
 EXOTHERMIC REACTIONS  
 TEMPERATURE  
 THERMOCHEMISTRY  
 THERMOGRAVIMETRY  
 THERMAL DEFOCUSING  
 USE THERMAL BLOOMING  
 THERMAL DEGRADATION  
 O602 3303 3501  
 GS DEGRADATION  
 #THERMAL DEGRADATION  
 RT PYROLYSIS  
 STERILIZATION EFFECTS  
 TEMPERATURE  
 TEMPERATURE DEPENDENCE  
 TEMPERATURE EFFECTS  
 THERMAL DIFFUSION  
 O602 3303 3304 3501  
 GS DIFFUSION  
 #THERMAL DIFFUSION  
 THERMODYNAMIC PROPERTIES  
 .THERMOPHYSICAL PROPERTIES  
 .#THERMAL DIFFUSION  
 CHAPMAN-ENSKOG THEORY  
 % CONDUCTION  
 CONVECTIVE FLOW  
 ELECTRON DIFFUSION  
 GAS HEATING  
 GASEOUS DIFFUSION  
 HEAT TRANSFER  
 KIRKENDALL EFFECT  
 PECLET NUMBER  
 % SEPARATION  
 SORET COEFFICIENT  
 SURFACE DIFFUSION  
 TEMPERATURE  
 THERMOCHEMISTRY  
 THERMOHYDRAULICS  
 VISCOSITY  
 THERMAL DIFFUSIVITY  
 O101 1202 2311 3303 3501  
 GS THERMODYNAMIC PROPERTIES  
 .THERMOPHYSICAL PROPERTIES  
 .#THERMAL DIFFUSIVITY  
 TRANSPORT PROPERTIES  
 #THERMAL DIFFUSIVITY  
 RT TEMPERATURE  
 VISCOSITY  
 THERMAL DISSOCIATION  
 O602 0603 3303 3501  
 GS CHEMICAL REACTIONS  
 #THERMAL DISSOCIATION  
 DISSOCIATION  
 #THERMAL DISSOCIATION  
 CRACKING (CHEMICAL ENGINEERING)  
 DECOMPOSITION  
 DEGRADATION  
 GAS DISSOCIATION  
 HEAT OF DISSOCIATION  
 HYDROGEN PRODUCTION  
 IONIZATION  
 PLASMAS (PHYSICS)  
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 THERMAL EFFECTS  
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 USE THERMODYNAMIC EFFICIENCY



# NASA THESAURUS HIERARCHICAL UPDATE

THERMAL EMISSION  
 1002 3303 3501  
 GS EMISSION  
 #THERMAL EMISSION  
 ..THERMIONIC EMISSION  
 ELECTRON EMISSION  
 EMISSION  
 EXHAUST EMISSION  
 INCANDESCENCE  
 INFRARED ABSORPTION  
 TEMPERATURE  
 RT  
 THERMAL ENERGY  
 3303 3304 3501  
 UF THERMAL AGITATION  
 RT COGENERATION  
 % ENERGY  
 FREE ENERGY  
 GEOTHERMAL ENERGY CONVERSION  
 GEOTHERMAL RESOURCES  
 HEAT  
 HEAT OF FUSION  
 HEAT OF SOLUTION  
 INTERNAL ENERGY  
 KINETIC ENERGY  
 LATTICE VIBRATIONS  
 PHOTO THERMAL CONVERSION  
 SOLAR THERMAL ELECTRIC POWER PLANTS  
 TEMPERATURE  
 THERMAL ENERGY STORAGE  
 USE HEAT STORAGE  
 THERMAL ENVIRONMENTS  
 0504 0507 0508 3008 3303  
 GS ENVIRONMENTS  
 #THERMAL ENVIRONMENTS  
 ADIABATIC CONDITIONS  
 AEROSPACE ENVIRONMENTS  
 HEAT STROKE  
 HIGH TEMPERATURE ENVIRONMENTS  
 LIFE SUPPORT SYSTEMS  
 LOW TEMPERATURE ENVIRONMENTS  
 LUNAR ENVIRONMENT  
 PLANETARY ENVIRONMENTS  
 SATELLITE TEMPERATURE  
 SPACECRAFT ENVIRONMENTS  
 TEMPERATURE  
 THERMAL COMFORT  
 THERMAL EXPANSION  
 1203 3203 3303 3501  
 GS EXPANSION  
 #THERMAL EXPANSION  
 THERMODYNAMIC PROPERTIES

#THERMAL EXPANSION  
 BOUSSINESQ APPROXIMATION  
 DILATOMETRY  
 EXTENSOMETERS  
 GRUNEISEN CONSTANT  
 HEAT TRANSFER  
 HIGH TEMPERATURE TESTS  
 LOW TEMPERATURE TESTS  
 NEEL TEMPERATURE  
 % PHYSICAL PROPERTIES  
 TEMPERATURE  
 THERMAL BUCKLING  
 THERMOPHYSICAL PROPERTIES  
 WARPAGE  
 THERMAL FATIGUE  
 1701 1704 3204 3303 3501  
 UF HIGH TEMPERATURE FATIGUE  
 GS FATIGUE (MATERIALS)  
 #THERMAL FATIGUE  
 RT HIGH TEMPERATURE ENVIRONMENTS  
 METAL FATIGUE  
 TEMPERATURE  
 THERMAL GRAVIMETRY  
 USE THERMOGRAVIMETRY  
 THERMAL INSTABILITY  
 0603 1202 3203 3303 3501  
 GS THERMODYNAMIC PROPERTIES  
 #THERMAL INSTABILITY  
 CLEAR AIR TURBULENCE  
 COMBUSTION STABILITY  
 MAGNETO HYDRODYNAMIC STABILITY  
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 STELLARATORS  
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 THERMAL INSULATION  
 0507 2303 3303 3305 3501  
 GS INSULATION  
 #THERMAL INSULATION  
 RT AIR CONDITIONING  
 AMBERLITE (TRADEMARK)  
 ASBESTOS  
 CORK (MATERIALS)  
 CRYOGENIC FLUID STORAGE  
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 HEAT SHIELDING  
 HEAT SINKS  
 HEAT TRANSFER  
 HEAT TRANSMISSION  
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 REENTRY SHIELDING

REFRACTORIES  
 REFRACTORY COATINGS  
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 THERMAL MAPPING  
 3006 3009  
 GS MAPPING  
 #THERMAL MAPPING  
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 EARTH RESOURCES  
 GEOTHERMAL ANOMALIES  
 GEOTHERMAL RESOURCES  
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 INFRARED SCANNERS  
 ISOTHERMAL LAYERS  
 ISOTHERMS  
 PHOTOMAPPING  
 PLANETARY MAPPING  
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 TEMPERATURE DISTRIBUTION  
 TEMPERATURE GRADIENTS  
 THERMOGRAPHY  
 THERMAL NEUTRONS  
 2203 2403 2405  
 UF SLOW NEUTRONS  
 GS NUCLEAR RADIATION  
 #THERMAL NEUTRONS  
 PARTICLES  
 .ELEMENTARY PARTICLES  
 ..FERMIONS  
 ...NEUTRONS  
 ...#THERMAL NEUTRONS  
 .NEUTRAL PARTICLES  
 ..NEUTRONS  
 ...#THERMAL NEUTRONS  
 BARYONS  
 FAST NEUTRONS  
 NUCLEAR REACTORS  
 TEMPERATURE  
 THERMALIZATION (ENERGY ABSORPTION)  
 THERMAL NOISE  
 0704 2402 3303  
 GS ELASTIC WAVES  
 .SOUND WAVES  
 ..NOISE (SOUND)  
 ...#THERMAL NOISE  
 ELECTROMAGNETIC INTERFERENCE  
 .RADIO FREQUENCY INTERFERENCE  
 ..ELECTROMAGNETIC NOISE  
 ...WHITE NOISE

|                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                               |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                                                         | ...#THERMAL NOISE<br>CHANNEL NOISE<br>ELECTROMAGNETIC NOISE MEASUREMENT<br>NOISE TEMPERATURE<br>SHOT NOISE<br>TEMPERATURE                                                                                                                                                                                                                                                                                     | RT | #THERMAL PROTECTION<br>ABLATIVE MATERIALS<br>CARBON-CARBON COMPOSITES<br>HEAT SHIELDING<br>LUDOX (TRADEMARK)<br>RADIATION PROTECTION<br>REENTRY SHIELDING<br>REUSABLE HEAT SHIELDING<br>TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                         | OXIDATION RESISTANCE<br>% RESISTANCE<br>SPECIFIC HEAT<br>TEMPERATURE<br>TEMPERATURE EFFECTS<br>THERMODYNAMIC PROPERTIES                                                                                                                                                                                                                                                    |
| THERMAL PLASMAS<br>2502 3303<br>GS                                                         | PARTICLES<br>.CHARGED PARTICLES<br>..ENERGETIC PARTICLES<br>...PLASMAS (PHYSICS)<br>...#THERMAL PLASMAS<br>ELECTRON PLASMA<br>HIGH TEMPERATURE PLASMAS<br>PLASMA GENERATORS<br>PLASMA TEMPERATURE<br>TEMPERATURE                                                                                                                                                                                              | RT | THERMAL RADIATION<br>2402 3303 3304 2903 3501<br>SN<br>(EMITTED AS THE RESULT OF THERMAL<br>EXCITATION OF MOLECULES)<br>GS<br>ELECTROMAGNETIC RADIATION<br>#THERMAL RADIATION<br>...BLACK BODY RADIATION<br>...PHONON BEAMS<br>CONCENTRATORS<br>GREENHOUSE EFFECT<br>HEAT<br>INFRARED RADIATION<br>LIGHT (VISIBLE RADIATION)<br>NEAR INFRARED RADIATION<br>NONGRAY GAS<br>NONTHERMAL RADIATION<br>PLANCKS CONSTANT<br>PLANETARY RADIATION<br>% RADIATION<br>RADIO WAVES<br>SKY RADIATION<br>SOLAR RADIATION<br>SUNLIGHT<br>TEMPERATURE<br>THERMODYNAMIC PROPERTIES<br>ULTRAVIOLET RADIATION | THERMAL RESOURCES<br>1303 1306 1308 1310<br>GS<br>HEAT SOURCES<br>#THERMAL RESOURCES<br>...GEYSERS<br>RESOURCES<br>.EARTH RESOURCES<br>.#THERMAL RESOURCES<br>...GEOTHERMAL RESOURCES<br>...GEYSERS<br>AGROMETEOROLOGY<br>ATMOSPHERIC TEMPERATURE<br>CROP GROWTH<br>CROP VIGOR<br>GEOTHERMAL TECHNOLOGY<br>RESOURCES MANAGEMENT<br>TEMPERATURE<br>TEMPERATURE DISTRIBUTION |
| THERMAL POLLUTION<br>0404 0408 0411 0505 1306 2202 3303<br>3304 0504<br>GS                 | POLLUTION<br>#THERMAL POLLUTION<br>BIOLOGICAL EFFECTS<br>COASTAL ECOLOGY<br>ENVIRONMENT EFFECTS<br>ENVIRONMENT POLLUTION<br>ENVIRONMENTAL QUALITY<br>ENVIRONMENTAL SURVEYS<br>ENVIRONMENTS<br>HEAT TRANSFER<br>LAKES<br>LIQUID COOLING<br>MARINE BIOLOGY<br>NUCLEAR REACTORS<br>OCEAN TEMPERATURE<br>OCEANS<br>PLANKTON<br>POLLUTION TRANSPORT<br>SEAS<br>TEMPERATURE<br>WATER POLLUTION<br>WATER TEMPERATURE | RT | THERMAL SHIELDING<br>USE HEAT SHIELDING<br>THERMAL SHOCK<br>3203 3303 3501<br>RT<br>COOLING<br>HEATING<br>HIGH TEMPERATURE TESTS<br>% SHOCK<br>SHOCK RESISTANCE<br>TEMPERATURE<br>TEMPERATURE DISTRIBUTION<br>THERMODYNAMIC PROPERTIES                                                                                                                                                                                                                                                                                                                                                      | THERMAL SHIELDING<br>USE HEAT SHIELDING<br>THERMAL SHOCK<br>3203 3303 3501<br>RT<br>COOLING<br>HEATING<br>HIGH TEMPERATURE TESTS<br>% SHOCK<br>SHOCK RESISTANCE<br>TEMPERATURE<br>TEMPERATURE DISTRIBUTION<br>THERMODYNAMIC PROPERTIES                                                                                                                                     |
| THERMAL POWER<br>USE TURBOGENERATORS<br>THERMAL PROPERTIES<br>USE THERMODYNAMIC PROPERTIES | POWER<br>TURBOGENERATORS<br>PROPERTIES<br>THERMODYNAMIC PROPERTIES                                                                                                                                                                                                                                                                                                                                            | RT | THERMAL RESISTANCE<br>1704 1803 3304 3303 3501<br>UF<br>HEAT RESISTANCE<br>GS<br>MECHANICAL PROPERTIES<br>#THERMAL RESISTANCE<br>CARBON-CARBON COMPOSITES<br>RT<br>% HIGH RESISTANCE<br>HIGH TEMPERATURE LUBRICANTS<br>HIGH TEMPERATURE TESTS<br>% LOW RESISTANCE<br>OXIDATION                                                                                                                                                                                                                                                                                                              | THERMAL SIMULATION<br>1107 1108 3104 3303 3501<br>GS<br>SIMULATION<br>.ENVIRONMENT SIMULATION<br>.#THERMAL SIMULATION<br>ALTITUDE SIMULATION<br>SOLAR SIMULATION<br>SPACE ENVIRONMENT SIMULATION<br>TEMPERATURE                                                                                                                                                            |
| THERMAL PROTECTION<br>0507 0508 3303 3305 3501<br>GS                                       | PROTECTION                                                                                                                                                                                                                                                                                                                                                                                                    | RT | THERMAL SINKS<br>USE HEAT SINKS<br>THERMAL STABILITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | THERMAL SINKS<br>USE HEAT SINKS<br>THERMAL STABILITY                                                                                                                                                                                                                                                                                                                       |

# NASA THESAURUS HIERARCHICAL UPDATE

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3304
UF THERMOSTABILITY
GS STABILITY
    #THERMAL STABILITY
    THERMODYNAMIC PROPERTIES
    .THERMOPHYSICAL PROPERTIES
    .#THERMAL STABILITY
    DIMENSIONAL STABILITY
    HIGH TEMPERATURE TESTS
    LOW TEMPERATURE TESTS
    STORAGE STABILITY
    SURFACE STABILITY
    TEMPERATURE
    TEMPERATURE DEPENDENCE

RT
    THERMAL STRESSES
    1701 1704 3203 3303 3304 3501
    SN (EXCLUDES BIOLOGICAL STRESSES)
    GS STRESSES
        #THERMAL STRESSES
        RT COOLING
        FATIGUE (MATERIALS)
        HEATING
        TEMPERATURE
        TEMPERATURE DISTRIBUTION
        TEMPERATURE EFFECTS

THERMAL VACUUM TESTS
1106 1108 1203 1506 3501
GS VACUUM TESTS
    #THERMAL VACUUM TESTS
    RT ENVIRONMENTAL TESTS
    HIGH ALTITUDE ENVIRONMENTS
    TEMPERATURE
    TEST CHAMBERS
    % TESTS
    VACUUM CHAMBERS

THERMALIZATION (ENERGY ABSORPTION)
2401 2403 2405 3303
GS ENERGY ABSORPTION
    .MODERATION (ENERGY ABSORPTION)
    .#THERMALIZATION (ENERGY
        ABSORPTION)
    ...NEUTRON THERMALIZATION
    RT THERMAL NEUTRONS

THERMIONS
0905 2310
GS ELECTRON TUBES
    .CAMERA TUBES
    ...VIDICONS
    ...RETURN BEAM VIDICONS
    ...#THERMIONS
    .IMAGE TUBES

    .#THERMIONS
    OPTICAL EQUIPMENT
    .IMAGE CONVERTERS
    .IMAGE TUBES
    .#THERMIONS

THERMIONIC CATHODES
0903 0905 2402 3303
GS ELECTRODES
    .CATHODES
    ..TUBE CATHODES
    ..#THERMIONIC CATHODES
    EMITTERS
    #THERMIONIC CATHODES

RT HOT CATHODES

THERMIONIC CONVERSION SYSTEMS
USE THERMIONIC POWER GENERATION

THERMIONIC CONVERTERS
0301 0903 0905 2402 3303
GS ELECTRIC GENERATORS
    .DIRECT POWER GENERATORS
    .#THERMIONIC CONVERTERS
    ... SNAP 13
    ...SOLAR BLANKETS
    RT CESIUM DIODES
    CESIUM PLASMA
    % CONVERTERS
    FUEL CELLS
    ION PRODUCTION RATES
    MAGNETOHYDRODYNAMIC GENERATORS
    PLASMA POWER SOURCES
    RADIOISOTOPE BATTERIES
    SNAP
    SOLAR CELLS
    THERMOELECTRIC GENERATORS

THERMIONIC DIODES
0903 0905 2402 3303
GS ELECTRON TUBES
    #THERMIONIC DIODES
    ..CESIUM DIODES
    ELECTRONIC EQUIPMENT
    .DIODES
    .#THERMIONIC DIODES
    ...CESIUM DIODES
    RT CHILD-LANGMUIR LAW
    PERVEANCE
    SEMICONDUCTOR DIODES

THERMIONIC EMISSION
2401 2402 2403 3303
UF RICHARDSON-DUSHMAN EQUATION
GS EMISSION

    .PARTICLE EMISSION
    .#THERMIONIC EMISSION
    .THERMAL EMISSION
    .#THERMIONIC EMISSION
    ELECTRON EMISSION
    ION EMISSION
    THERMOELECTRICITY
    WORK FUNCTIONS

RT
    THERMIONIC EMITTERS
    0905 2304 3303 3304
    GS EMITTERS
    #THERMIONIC EMITTERS

THERMIONIC POWER GENERATION
0903 0905 1002 2402 2403 3303
UF THERMIONIC CONVERSION SYSTEMS
RT % CONVERSION
    SNAP
    SNAP 13

THERMIONIC REACTORS
USE ION ENGINES
    NUCLEAR ROCKET ENGINES

THERMIONICS
1002 2402 3303
RT CATHODES
    ELECTRON EMISSION
    % ELECTRONICS
    ION EMISSION

THERMISTORS
0905 0906 2602 3303
GS ATTENUATORS
    .RESISTORS
    .#THERMISTORS
    ELECTRONIC EQUIPMENT
    .SOLID STATE DEVICES
    ..SEMICONDUCTOR DEVICES
    ..#THERMISTORS
    TEMPERATURE SENSORS
    #THERMISTORS
    RT RADIOMETERS
    TEMPERATURE MEASURING INSTRUMENTS
    VARISTORS

THERMITES
0603
RT ALUMINUM OXIDES
    AUGER SPECTROSCOPY
    BARIUM ION CLOUDS
    COPPER OXIDES
    IGNITION TEMPERATURE
    PYROTECHNICS
  
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THERMOBALANCES
3303 3304
GS MEASURING INSTRUMENTS
  .INDICATING INSTRUMENTS
  ..WEIGHT INDICATORS
  ..#THERMOBALANCES
RT THERMOGRAVIMETRY

THERMOCHEMICAL PROPERTIES
0602 3301 3304
GS CHEMICAL PROPERTIES
  #THERMOCHEMICAL PROPERTIES
    ..HEAT OF COMBUSTION
    ..HEAT OF DISSOCIATION
    ..HEAT OF FORMATION
    ..HEAT OF SOLUTION
    ..LATENT HEAT
    ...HEAT OF FUSION
    ...HEAT OF VAPORIZATION
  THERMODYNAMIC PROPERTIES
  #THERMOCHEMICAL PROPERTIES
    ..HEAT OF COMBUSTION
    ..HEAT OF DISSOCIATION
    ..HEAT OF FORMATION
    ..HEAT OF SOLUTION
    ..LATENT HEAT
    ...HEAT OF FUSION
    ...HEAT OF VAPORIZATION
RT HEAT BALANCE
  % PROPERTIES

THERMOCHEMISTRY
0603 1701 1704 3304
GS #THERMOCHEMISTRY
  .AEROTHERMOCHEMISTRY
  .COMBUSTION CHEMISTRY
RT CHEMICAL ENGINEERING
  CHEMICAL REACTIONS
  % CHEMISTRY
    COMBUSTION PHYSICS
    ENTHALPY
    ENTROPY
    HEAT
    HEAT BALANCE
    HEAT OF DISSOCIATION
    HEAT OF FUSION
    HEAT OF SOLUTION
    HEAT TREATMENT
    PHYSICAL CHEMISTRY
    PROPELLANT CHEMISTRY
    PYROMETALLURGY
    THERMAL DECOMPOSITION
    THERMAL DIFFUSION
  THERMODYNAMIC PROPERTIES

THERMODYNAMICS
THERMOGRAVIMETRY
THERMOPHYSICAL PROPERTIES
WATER SPLITTING

THERMOCHROMATIC MATERIALS
0603 1704 1804
RT COLOR
  COLORIMETRY
  % INORGANIC MATERIALS
  % MATERIALS
  OPTICAL PROPERTIES
  ORGANIC MATERIALS
  SOLIDS

THERMOCLINES
1310 3303 3304
GS GRADIENTS
  .TEMPERATURE GRADIENTS
  .#THERMOCLINES
RT OCEANOGRAPHY
  SEA WATER
  SOUND TRANSMISSION
  STRATIFICATION
  SURFACE LAYERS
  SURFACE TEMPERATURE
  UNDERWATER ACOUSTICS

THERMOCOUPLE PYROMETERS
1408 3303 3501
GS MEASURING INSTRUMENTS
  .TEMPERATURE MEASURING INSTRUMENTS
  ..PYROMETERS
  ..#THERMOCOUPLE PYROMETERS
RT GALVANOMETERS
  POTENTIOMETERS (INSTRUMENTS)
  RADIATION PYROMETERS
  RESISTANCE THERMOMETERS
  TEMPERATURE MEASUREMENT
  THERMOCOUPLES
  THERMOELEMENT AMMETERS

THERMOCOUPLES
0301 1701 1704 3305
GS #THERMOCOUPLES
  .THERMOPILES
RT CONSTANTAN
  INDICATING INSTRUMENTS
  MANGANIN (TRADEMARK)
  PELTIER EFFECTS
  POTENTIOMETERS (INSTRUMENTS)
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  TEMPERATURE MEASUREMENT
  TEMPERATURE MEASURING INSTRUMENTS
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THERMOELECTRICITY

THERMODYNAMIC COUPLING
3303 3304 3501
GS COUPLING
  #THERMODYNAMIC COUPLING
RT BCS THEORY
  ELECTRON PHONON INTERACTIONS
  SUPERCONDUCTORS

THERMODYNAMIC CYCLES
2003 3301 3304
GS CYCLES
  #THERMODYNAMIC CYCLES
    ..BRAYTON CYCLE
    ..CARNOT CYCLE
    ..OTTO CYCLE
    ..RANKINE CYCLE
    ..STIRLING CYCLE
RT ADIABATIC CONDITIONS
  CLOSED CYCLES
  HEAT ENGINES
  INTERNAL COMBUSTION ENGINES
  LASER PROPULSION
  % STROKES
  THERMODYNAMICS

THERMODYNAMIC EFFICIENCY
1504 3304
UF THERMAL EFFICIENCY
GS EFFICIENCY
  #THERMODYNAMIC EFFICIENCY
RT COMBUSTION EFFICIENCY
  COMPRESSOR EFFICIENCY
  ENGINES
  HEAT SOURCES
  INTERNAL COMBUSTION ENGINES
  NOZZLE EFFICIENCY
  POWER EFFICIENCY
  PROPULSION SYSTEM PERFORMANCE
  PROPULSIVE EFFICIENCY
  SPECIFIC IMPULSE
  TEMPERATURE
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THERMODYNAMIC EQUILIBRIUM
1905 2308 3304
RT ACID BASE EQUILIBRIUM
  ADIABATIC CONDITIONS
  CHEMICAL EQUILIBRIUM
  % EQUILIBRIUM
  HEAT OF DISSOCIATION
  ISENTROPIC PROCESSES

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ISOCORIC PROCESSES  
 ISOENERGETIC PROCESSES  
 ISOTHERMAL PROCESSES  
 LIQUID-VAPOR EQUILIBRIUM  
 LOCAL THERMODYNAMIC EQUILIBRIUM  
 STATISTICAL MECHANICS

THERMODYNAMIC PROPERTIES  
 O603 1701 1704 3304  
 UF THERMAL PROPERTIES  
 GS #THERMODYNAMIC PROPERTIES

.ENTHALPY  
 ..GIBBS FREE ENERGY  
 ..HEAT OF DISSOCIATION  
 ..HEAT OF FORMATION  
 ..HEAT OF SOLUTION  
 ..LATENT HEAT  
 ...HEAT OF FUSION  
 ...HEAT OF VAPORIZATION  
 .ENTROPY  
 .FREE ENERGY  
 ..GIBBS FREE ENERGY  
 ..SURFACE ENERGY  
 .THERMAL EXPANSION  
 .THERMAL INSTABILITY  
 .THERMOCHEMICAL PROPERTIES  
 ..HEAT OF COMBUSTION  
 ..HEAT OF DISSOCIATION  
 ..HEAT OF FORMATION  
 ..HEAT OF SOLUTION  
 ..LATENT HEAT  
 ...HEAT OF FUSION  
 ...HEAT OF VAPORIZATION  
 .THERMOPHYSICAL PROPERTIES  
 ..CRITICAL POINT  
 ..CRITICAL PRESSURE  
 ..CRITICAL TEMPERATURE  
 ..EMISSIVITY  
 ..FUSIBILITY  
 ..HEAT OF SOLUTION  
 ..LATENT HEAT  
 ...HEAT OF FUSION  
 ...HEAT OF VAPORIZATION  
 ..MELTING POINTS  
 ..PYROELECTRICITY  
 ..SPECIFIC HEAT  
 ..SUPERCritical PRESSURES  
 ..THERMAL CONDUCTIVITY  
 ..THERMAL DIFFUSION  
 ..THERMAL DIFFUSIVITY  
 ..THERMAL STABILITY  
 ..VAPOR PRESSURE  
 ..VOLATILITY  
 CHEMICAL PROPERTIES  
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RT

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 % EQUILIBRIUM  
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 % PHYSICAL PROPERTIES  
 PRANDTL NUMBER  
 PROPELLANT PROPERTIES  
 % PROPERTIES  
 SEEBECK EFFECT  
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 THERMAL SHOCK  
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 THERMOLUMINESCENCE  
 ZERO POINT ENERGY

THERMODYNAMICS

3304  
 UF

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 THERMOMECHANICS  
 THERMOPHYSICS  
 #THERMODYNAMICS  
 .AEROTHERMODYNAMICS  
 .COMBUSTION PHYSICS  
 .NONEQUILIBRIUM THERMODYNAMICS  
 RT AERODYNAMICS  
 % DYNAMICS  
 ENGINES  
 ENTHALPY  
 ENTROPY

% EQUATIONS  
 EQUATIONS OF STATE  
 % EQUILIBRIUM  
 ERGODIC PROCESS  
 FLUID MECHANICS  
 FREE ENERGY  
 GAS DYNAMICS  
 HEAT  
 HEAT OF FUSION  
 HEAT OF SOLUTION  
 HEAT TRANSFER  
 INTERNAL ENERGY  
 IRREVERSIBLE PROCESSES  
 ISOTHERMS  
 JOULE-THOMSON EFFECT  
 KIRCHHOFF LAW OF RADIATION  
 MECHANICAL ENGINEERING

MOLECULAR RELAXATION  
 MOLLIER DIAGRAM  
 NONADIABATIC CONDITIONS  
 NONGRAY GAS  
 NONISOTHERMAL PROCESSES  
 ONSAGER RELATIONSHIP  
 % PATHS  
 PFAFF EQUATION  
 PHOTOTHERMAL CONVERSION  
 PHYSICAL CHEMISTRY  
 PLASMA PHYSICS  
 PLASMAS (PHYSICS)  
 POLYTROPIC PROCESSES  
 RANKINE CYCLE  
 RAYLEIGH EQUATIONS  
 STEAM  
 THERMOCHEMISTRY  
 THERMODYNAMIC CYCLES  
 THERMODYNAMIC EFFICIENCY  
 THERMODYNAMIC PROPERTIES  
 THERMOELECTRIC COOLING  
 UNSTEADY STATE

THERMOELASTICITY

O102 3203 3303 3304  
 GS MECHANICAL PROPERTIES  
 .ELASTIC PROPERTIES  
 .#THERMOELASTICITY  
 ...AEROTHERMOELASTICITY

RT AEROELASTICITY  
 AEROTHERMODYNAMICS  
 HYDROELASTICITY  
 THERMOELECTRIC GENERATORS  
 THERMOELECTRIC MATERIALS

THERMOELECTRIC CONVERSION SYSTEMS  
 USE THERMOELECTRIC POWER GENERATION

THERMOELECTRIC COOLING  
 O302 0504 2402 3303  
 UF ETTINGSHAUSEN COOLERS  
 GS COOLING  
 #THERMOELECTRIC COOLING  
 RT CRYOGENICS  
 ETTINGSHAUSEN EFFECT  
 HEAT PUMPS  
 PELTIER EFFECTS  
 REFRIGERATING  
 REFRIGERATING MACHINERY  
 THERMODYNAMICS  
 THERMOELECTRICITY  
 THERMOMAGNETIC COOLING

THERMOELECTRIC GENERATORS  
 O302 3303 3304

[illegible]

[illegible]

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

.#THIAMINE  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ..#THIAMINE  
 VITAMINS  
 #THIAMINE

THIAZINE (TRADEMARK)  
 1808 1811  
 GS  
 DYES  
 #THIAZINE (TRADEMARK)  
 NITROGEN COMPOUNDS  
 #THIAZINE (TRADEMARK)  
 ORGANIC COMPOUNDS  
 .CYCLIC COMPOUNDS  
 ..HETEROCYCLIC COMPOUNDS  
 ..#THIAZINE (TRADEMARK)  
 SULFUR COMPOUNDS  
 #THIAZINE (TRADEMARK)

THICK FILMS  
 1503 1704 1802  
 RT  
 ELECTRONIC PACKAGING  
 % FILMS  
 INTEGRATED CIRCUITS  
 MICROMINIATURIZATION  
 PRINTED CIRCUITS  
 SEMICONDUCTING FILMS  
 SUPERCONDUCTING FILMS  
 THIN FILMS

THICK PLATES  
 O101  
 RT  
 FLAT PLATES  
 METAL PLATES  
 % PLATES  
 PLATES (STRUCTURAL MEMBERS)  
 % SHEETS  
 THICKNESS  
 THIN PLATES

THICK WALLS  
 1202 3203  
 GS  
 WALLS  
 #THICK WALLS  
 BOILER PLATE  
 BULKHEADS  
 REINFORCEMENT (STRUCTURES)  
 STRUCTURAL MEMBERS  
 THIN WALLS  
 WALL PRESSURE  
 WALL TEMPERATURE

% THICKENERS  
 O603 1202

SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT THICKENERS (EQUIPMENT)  
 THICKENERS (MATERIALS)

THICKENERS (EQUIPMENT)  
 1202  
 GS

SEPARATORS  
 .CLASSIFIERS  
 .#THICKENERS (EQUIPMENT)  
 RT COALESCING  
 PRECIPITATORS  
 % THICKENERS

THICKENERS (MATERIALS)  
 O602  
 RT

ADDITIVES  
 GELS  
 GREASES  
 % MATERIALS  
 % THICKENERS

THICKNESS  
 3408  
 RT  
 AIRFOIL PROFILES  
 DEPTH  
 DIAMETERS  
 DIMENSIONS  
 FILM THICKNESS  
 LENGTH  
 OPTICAL THICKNESS  
 SPACING  
 TARGET THICKNESS  
 THICK PLATES  
 THICKNESS RATIO  
 VOLUME

THICKNESS RATIO  
 O101 3203  
 GS  
 RATIOS  
 #THICKNESS RATIO  
 RT AIRFOIL PROFILES  
 AIRFOILS  
 FINENESS RATIO  
 THICKNESS  
 THIN AIRFOILS  
 THIN WINGS

THIGH  
 O404  
 GS  
 ANATOMY  
 #THIGH  
 RT LEG (ANATOMY)

THIN AIRFOILS  
 O101 0102 0104 3203  
 GS  
 AIRFOILS  
 #THIN AIRFOILS  
 ..THIN WINGS  
 ...INFINITE SPAN WINGS  
 RT AIRFOIL PROFILES  
 THICKNESS RATIO

% THIN BODIES  
 O101 0102 0104 3203  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT SLENDER BODIES  
 THIN PLATES  
 THIN WALLS  
 THIN WINGS

THIN FILMS  
 1503 1506 1704 1802  
 SN (SOLID STATE PHYSICS AND  
 ELECTRONICS)  
 GS #THIN FILMS

.DIAMOND FILMS  
 .ENERGY ABSORPTION FILMS  
 .FERROMAGNETIC FILMS  
 .MONOMOLECULAR FILMS  
 ..LANGMUIR-BLODGETT FILMS  
 AMORPHOUS SILICON  
 ATOMIC FORCE MICROSCOPY  
 COATINGS  
 COMPUTER STORAGE DEVICES  
 ELECTROCHROMISM  
 ELECTRODE FILM BARRIERS  
 % FILMS

HETEROJUNCTIONS  
 INTEGRATED CIRCUITS  
 INTEGRATED OPTICS  
 ION PLATING  
 METAL FILMS  
 MICROCHANNEL PLATES  
 MICROMINIATURIZATION  
 MINIATURE ELECTRONIC EQUIPMENT  
 MOLECULAR ELECTRONICS  
 OXIDE FILMS  
 PARAMETRONS  
 PELLICLE  
 PLATING  
 PRAETERSONIC DEVICES  
 RECTIFIERS  
 SEMICONDUCTING FILMS  
 SILICON FILMS  
 SOLID STATE DEVICES  
 % SOLID STATE PHYSICS

SPUTTERING GAGES  
SQUEEZE FILMS  
SUPERCONDUCTING FILMS  
THICK FILMS  
WAFERS  
YBCO SUPERCONDUCTORS  
YTTRIA-STABILIZED ZIRCONIA

THIN LAYER CHROMATOGRAPHY  
O403 O601 O602  
GS CHEMICAL TESTS  
.CHEMICAL ANALYSIS  
..CHROMATOGRAPHY  
..#THIN LAYER CHROMATOGRAPHY  
RT GAS CHROMATOGRAPHY  
MONOMOLECULAR FILMS

THIN PLATES  
O101 O102 3203  
SN (EXCLUDES THIN SURFACE COATINGS  
AND FILMS)

RT DIAPHRAGMS (MECHANICS)  
FLAT PLATES  
FOILS (MATERIALS)  
METAL PLATES  
PANELS  
PARALLEL PLATES  
% PLATES (STRUCTURAL MEMBERS)  
% SHEETS  
THICK PLATES  
% THIN BODIES

THIN WALLED SHELLS  
O101 O102 3203  
GS SHELLS (STRUCTURAL FORMS)  
#THIN WALLED SHELLS  
CYLINDRICAL SHELLS  
MEMBRANE STRUCTURES  
METAL SHELLS  
ORTHOTROPIC SHELLS  
REINFORCED SHELLS  
SKIN (STRUCTURAL MEMBER)  
SPHERICAL SHELLS  
STRESSED-SKIN STRUCTURES  
TOROIDAL SHELLS

THIN WALLS  
O101 O102 3203  
GS WALLS  
#THIN WALLS  
RT BULKHEADS  
DIAPHRAGMS (MECHANICS)  
PARTITIONS (STRUCTURES)  
SKIN (STRUCTURAL MEMBER)

THICK WALLS  
% THIN BODIES

THIN WINGS  
O102 O104 O202 3203  
GS AIRFOILS  
.THIN AIRFOILS  
..#THIN WINGS  
...INFINITE SPAN WINGS  
.WINGS  
..#THIN WINGS  
...INFINITE SPAN WINGS  
RT AIRFOIL PROFILES  
FIXED WINGS  
FLEXIBLE WINGS  
THICKNESS RATIO  
% THIN BODIES  
UNCAMBERED WINGS

THINNERS  
USE SOLVENTS

THIOLS  
1808  
UF DITHIOLS  
MERCAPTAN  
MERCAPTO COMPOUNDS  
SULFUR COMPOUNDS  
#THIOLS  
..CYSTEINE  
..DIMERCAPROL  
RT ALCOHOLS  
% CHEMICAL COMPOUNDS  
PHENOLS

THIOPLASTICS  
1805 1808 1809 1810  
GS RUBBER  
.SYNTHETIC RUBBERS  
..ELASTOMERS  
..#THIOPLASTICS  
RT PLASTICS  
SULFIDES

THIOUREAS  
O403 1808  
GS NITROGEN COMPOUNDS  
.AMIDES  
..UREAS  
..#THIOUREAS

THIURONIUM  
O401 O411 1808  
GS AMINES  
#THIURONIUM

NITROGEN COMPOUNDS  
.AMIDES  
..UREAS  
..#THIURONIUM

THIXOTROPIC PROPELLANTS  
USE GELLED ROCKET PROPELLANTS

THIXOTROPY  
1202 2312  
RT GELATION  
GELS  
LIQUEFACTION  
NONNEWTONIAN FLOW  
% PHYSICAL PROPERTIES  
SEMISOLIDS  
SOLUBILITY  
VISCOSITY

THOMAS-FERMI MODEL  
2304 2401  
UF THOMAS-FERMI THEORY  
GS MODELS  
.MATHEMATICAL MODELS  
..#THOMAS-FERMI MODEL  
RT ATOMIC STRUCTURE  
ELECTRON DISTRIBUTION  
PLASMA COMPOSITION  
QUANTUM STATISTICS

THOMAS-FERMI THEORY  
USE THOMAS-FERMI MODEL

THOMSON EFFECT  
USE THERMOELECTRICITY

THOMSON SCATTERING  
O710 2309 2311 3407  
GS SCATTERING  
.WAVE SCATTERING  
..ELECTROMAGNETIC SCATTERING  
..#THOMSON SCATTERING  
RT ELECTROMAGNETIC RADIATION

THOR ABLE ROCKET VEHICLE  
3103 3106 3401 3409  
GS LAUNCH VEHICLES  
.THOR LAUNCH VEHICLES  
..#THOR ABLE ROCKET VEHICLE  
..THORAD LAUNCH VEHICLES  
..#THOR ABLE ROCKET VEHICLE  
ROCKET VEHICLES  
.MULTISTAGE ROCKET VEHICLES  
..THOR LAUNCH VEHICLES  
..#THOR ABLE ROCKET VEHICLE

[illegible]

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CHALCOGENIDES
.OXIDES
..METAL OXIDES
..#THORIUM OXIDES
RT DIOXIDES

THORIUM 228
USE THORIUM ISOTOPES

THORIUM 230
USE THORIUM ISOTOPES

THORIUM 234
USE THORIUM ISOTOPES

THORON
USE RADON ISOTOPES

THREADS
1504 1811
SN (EXCLUDES TEXTILES AND FILAMENTARY
FORMS)
RT BOLTS
NUTS (FASTENERS)
SCREWS

THREAT EVALUATION
3401
RT AIRCRAFT HAZARDS
AIRCRAFT SAFETY
COLLISION AVOIDANCE
MIDAIR COLLISIONS
RADAR TRACKING
WARNING SYSTEMS

THREE AXIS STABILIZATION
3407
GS STABILIZATION
#THREE AXIS STABILIZATION
RT INERTIAL PLATFORMS
SATELLITE ATTITUDE CONTROL
SATELLITE ORIENTATION
STABILIZED PLATFORMS

THREE BODY PROBLEM
1901 1902 2308 3006 3009
RT CELESTIAL MECHANICS
FOUR BODY PROBLEM
MANY BODY PROBLEM
ORBITS
PERTURBATION
% PROBLEMS
TRIPLE STARS
TROJAN ORBITS
TWO BODY PROBLEM

COMPUTER AIDED DESIGN
COMPUTERIZED SIMULATION
MATHEMATICAL MODELS
TWO DIMENSIONAL MODELS

THREE DIMENSIONAL BODIES
0603 0102
RT AERODYNAMIC CONFIGURATIONS
% BODIES
BOUNDARY VALUE PROBLEMS
FLOW DISTRIBUTION

THREE DIMENSIONAL BOUNDARY LAYER
0101 0102 1202 1203
GS BOUNDARY LAYERS
#THREE DIMENSIONAL BOUNDARY LAYER
RT AXISYMMETRIC FLOW
BOUNDARY LAYER TRANSITION
COMPRESSIBLE BOUNDARY LAYER
LAMINAR BOUNDARY LAYER
% LAYERS
SECONDARY FLOW
TURBULENT BOUNDARY LAYER
VELOCITY DISTRIBUTION

THREE DIMENSIONAL COMPOSITES
1704 1805
GS COMPOSITE MATERIALS
#THREE DIMENSIONAL COMPOSITES
RT BRAIDED COMPOSITES
FIBER COMPOSITES
% MATERIALS
WOVEN COMPOSITES

THREE DIMENSIONAL FLOW
1202 1203
GS FLUID FLOW
.PARALLEL FLOW
.#THREE DIMENSIONAL FLOW
TRANSITIONAL MOTION
.THREE DIMENSIONAL MOTION
.#THREE DIMENSIONAL FLOW
...KARMAN-BODEWADT FLOW
...SECONDARY FLOW
AXIAL FLOW
CONICAL FLOW
FLOW GEOMETRY
HELICAL FLOW
ONE DIMENSIONAL FLOW
ROSHKO PREDICTION
SPHERICAL WAVES
TWO DIMENSIONAL FLOW
WEDGE FLOW

THREE DIMENSIONAL MODELS
0804 1106 1107 1108 1902 3501
GS MODELS
#THREE DIMENSIONAL MODELS
RT COMPUTATIONAL GRIDS

THRESHOLD CURRENTS
0902 1001 2302 2304
GS ELECTRIC CURRENT
#THRESHOLD CURRENTS
RT LASERS
THRESHOLD VOLTAGE
% THRESHOLDS

THRESHOLD DETECTORS (DOSIMETERS)
1409 2203 2403
GS MEASURING INSTRUMENTS
.RADIATION MEASURING INSTRUMENTS
...RADIATION DETECTORS
...DOSIMETERS
...#THRESHOLD DETECTORS
(DOSIMETERS)
RT IONIZATION CHAMBERS
% THRESHOLDS

THRESHOLD GATES
0801 1001 1201
GS CIRCUITS
.DIGITAL ELECTRONICS
...LOGIC CIRCUITS
...#THRESHOLD GATES
.GATES (CIRCUITS)
.#THRESHOLD GATES
RT % THRESHOLDS
TRIGGER CIRCUITS

THRESHOLD LOGIC
0802 1001 1201
GS MATHEMATICAL LOGIC
.SET THEORY
.#THRESHOLD LOGIC
RT GATES (CIRCUITS)
% LOGIC
LOGIC CIRCUITS
% THRESHOLDS
TRANSISTOR LOGIC

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# NASA THESAURUS HIERARCHICAL UPDATE

## TRIGGER CIRCUITS

### THRESHOLD SHIFT USE THRESHOLDS

#### THRESHOLD VOLTAGE

1002 2602  
GS POTENTIAL ENERGY  
-ELECTRIC POTENTIAL  
.#THRESHOLD VOLTAGE  
RT PHOTOVOLTAGES  
PHOTOVOLTAGE EFFECT  
SEMICONDUCTOR JUNCTIONS  
SILICON JUNCTIONS  
SOLID STATE DEVICES  
THRESHOLD CURRENTS

#### % THRESHOLDS

##### VOLT-AMPERE CHARACTERISTICS

#### % THRESHOLDS

1406 1409 2311 0408 0410  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

UF THRESHOLD SHIFT  
RT DOORS  
ENTRANCES  
NOISE THRESHOLD  
RESOLUTION  
RESPONSES  
SENSITIVITY  
THRESHOLD CURRENTS  
THRESHOLD DETECTORS (DOSIMETERS)  
THRESHOLD GATES  
THRESHOLD LOGIC  
THRESHOLD VOLTAGE  
THRESHOLDS (PERCEPTION)

#### THRESHOLDS (PERCEPTION)

0408 0410  
RT ACUITY

ADAPTATION  
AUDIOMETRY  
AUDITORY PERCEPTION  
AUDITORY SENSATION AREAS  
AUDITORY STIMULI

#### % FREQUENCY RESPONSE

HEARING  
LIGHT ADAPTATION  
LIMEN  
NEUROLOGY  
PERCEPTION  
PHOTOSENSITIVITY  
SENSITIVITY

## % THRESHOLDS

### VISION VISUAL PERCEPTION

#### THROATS

1202 1504 2501 2806  
SN (NON BIOLOGICAL)  
RT CARBURETORS  
% CHANNELS  
CHOKES (RESTRICTIONS)  
DUCTS  
NOZZLE GEOMETRY  
NOZZLE INSERTS  
NOZZLE WALLS  
ORIFICES

#### THROMBIN

0403 1808  
GS BIOPOLYMERS  
-PROTEINS  
-ENZYMES  
-.#THROMBIN  
BODY FLUIDS  
-BLOOD  
-.#THROMBIN  
ORGANIC COMPOUNDS  
-PROTEINS  
-ENZYMES  
-.#THROMBIN  
BLOOD COAGULATION  
FIBRIN  
FIBRINOGEN  
HEMOSTATICS  
PROTHROMBIN  
THROMBOPLASTIN

#### RT

#### THROMBOCYTES

0404 0406  
RT BLOOD COAGULATION  
CLOTTING

#### THROMBOPENIA

0404 0405  
GS DISEASES  
-.#THROMBOPENIA  
RT COAGULATION

#### THROMBOPLASTIN

0404 0406  
GS BODY FLUIDS  
-BLOOD  
-.#THROMBOPLASTIN  
RT BLOOD COAGULATION  
CLOTTING  
HEMOSTATICS

## HOMEOSTASIS PLATELETS THROMBIN

#### THROMBOSIS

0405 0408  
GS DISEASES  
-.#THROMBOSIS  
RT BLOOD COAGULATION  
INFARCTION  
MYOCARDIAL INFARCTION

#### THROTTLING

1504  
RT JOULE-THOMSON EFFECT  
VARIABLE THRUST

#### THROWING

1504 3407  
RT EJECTION  
SPREADING

#### THRUST

0101 0201 1202 2311 2801 2808  
UF THRUST POWER  
GS #THRUST  
-HIGH THRUST  
-JET THRUST  
-LEADING EDGE THRUST  
-LOW THRUST  
-.#MICROTHRUST  
-ROCKET THRUST  
-RETROTHRUST  
-STATIC THRUST  
-VARIABLE THRUST  
ACCELERATION (PHYSICS)  
AUXILIARY PROPULSION  
BURNING TIME  
DUAL THRUST NOZZLES  
% FORCE

#### RT

JET ENGINES  
NOZZLE THRUST COEFFICIENTS  
% POWER  
PROPULSION  
% REACTION  
ROCKET ENGINES  
ROCKET PROPELLANTS  
SPECIFIC IMPULSE

#### THRUST AUGMENTATION

0101 2802 2805 2808 3106  
GS AUGMENTATION  
-.#THRUST AUGMENTATION  
RT AFTERBURNING  
COANDA EFFECT

HIGH THRUST  
SECONDARY INJECTION  
SHROUDED PROPELLERS  
VARIABLE THRUST  
WATER INJECTION

THRUST BEARINGS  
1501 1503 2805 2808  
GS BEARINGS  
#THRUST BEARINGS  
RT ANTIFRICTION BEARINGS  
BALL BEARINGS  
GAS BEARINGS  
ROLLER BEARINGS

THRUST CHAMBER PRESSURE  
0401 0501 0502 0504 0506 2808  
GS PRESSURE  
#THRUST CHAMBER PRESSURE

THRUST CHAMBERS  
2805 2806 2808 3301  
UF ROCKET CHAMBERS  
RT ARC CHAMBERS  
% CHAMBERS  
COMBUSTION CHAMBERS  
DIVERGENT NOZZLES  
ROCKET ENGINE CASES

THRUST CONTROL  
2102 2807  
GS #THRUST CONTROL  
#THRUST VECTOR CONTROL  
RT ATTITUDE CONTROL  
% CONTROL  
CONTROL ROCKETS  
ENGINE CONTROL  
JET CONTROL  
% REACTION CONTROL  
ROCKET ENGINE CONTROL  
SATELLITE CONTROL  
TURBOJET ENGINE CONTROL  
VARIABLE THRUST

THRUST DISTRIBUTION  
0101  
RT AERODYNAMIC FORCES  
% DISTRIBUTION  
FORCE DISTRIBUTION  
LEADING EDGES  
PRESSURE DISTRIBUTION  
VORTICES  
WING PLANFORMS

THRUST FAULTS

USE GEOLOGICAL FAULTS

THRUST LOADS  
2805 2808 3106  
GS LOADS (FORCES)  
. DYNAMIC LOADS  
. #THRUST LOADS  
RT AERODYNAMIC LOADS  
AXIAL COMPRESSION LOADS  
AXIAL LOADS  
COMPRESSION LOADS  
JET THRUST  
ROCKET THRUST  
STRUCTURAL DESIGN CRITERIA

THRUST MEASUREMENT  
1406 2805 2808 3501  
GS MECHANICAL MEASUREMENT  
#THRUST MEASUREMENT  
RT ACCELEROMETERS  
DYNAMOMETERS  
% FORCE  
% MEASUREMENT

THRUST POWER  
USE THRUST

THRUST PROGRAMMING  
0802 0803 1904 2805 2808  
UF OPTIMUM THRUST PROGRAMMING  
GS PROGRAMMING (SCHEDULING)  
#THRUST PROGRAMMING  
RT FLIGHT MECHANICS  
FLIGHT OPTIMIZATION  
FLIGHT PLANS  
ORBITAL MECHANICS  
PARKING ORBITS  
PROPULSIVE EFFICIENCY  
TRAJECTORY CONTROL

THRUST REVERSAL  
2805 2808  
RT AIRCRAFT BRAKES  
BRAKES (FOR ARRESTING MOTION)  
BRAKING  
DECELERATION

THRUST TERMINATION  
2805 2808 3106  
GS STOPPING  
#THRUST TERMINATION  
RT BURNOUT  
ROCKET THRUST  
STAGE SEPARATION  
VARIABLE THRUST

THRUST VECTOR CONTROL  
2102 2805 2808 3102 3110  
UF TVC (CONTROL)  
GS ATTITUDE CONTROL  
. DIRECTIONAL CONTROL  
#THRUST VECTOR CONTROL  
FLIGHT CONTROL  
#THRUST VECTOR CONTROL  
THRUST CONTROL  
#THRUST VECTOR CONTROL  
RT AIR SLEW MISSILES  
AUTOMATIC CONTROL  
AUTOMATIC FLIGHT CONTROL  
% CONTROL  
GUIDE VANES  
GYROSTABILIZERS  
JET VANES  
LIQUID INJECTION  
MANEUVERABLE SPACECRAFT  
MISSILE CONTROL  
NOZZLE THRUST COEFFICIENTS  
ROCKET ENGINES  
SECONDARY INJECTION  
SPACECRAFT CONTROL  
VARIABLE THRUST  
VERNIER ENGINES

THRUST-WEIGHT RATIO  
0101 1406 2805 2808 3501  
GS RATIOS  
#THRUST-WEIGHT RATIO  
RT ACCELERATION (PHYSICS)  
MASS RATIOS  
PRESSURE RATIO  
ROCKET ENGINES

% THRUSTORS  
2808  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT ION ENGINES  
ROCKET ENGINES

THULIUM  
1703  
GS CHEMICAL ELEMENTS  
. RARE EARTH ELEMENTS  
. #THULIUM  
...THULIUM ISOTOPES  
METALS  
. RARE EARTH ELEMENTS  
. #THULIUM  
...THULIUM ISOTOPES

# NASA THESAURUS HIERARCHICAL UPDATE

## THULIUM COMPOUNDS

0603 1804  
GS RARE EARTH COMPOUNDS  
#THULIUM COMPOUNDS  
RT % CHEMICAL COMPOUNDS  
% METAL COMPOUNDS

## THULIUM ISOTOPES

2406  
UF THULIUM 171  
GS CHEMICAL ELEMENTS  
.NUCLIDES  
..ISOTOPES  
..#THULIUM ISOTOPES  
..RARE EARTH ELEMENTS  
..THULIUM  
..#THULIUM ISOTOPES  
METALS  
.RARE EARTH ELEMENTS  
..THULIUM  
..#THULIUM ISOTOPES

## THULIUM 171

USE THULIUM ISOTOPES

## THUNDERCHIEF AIRCRAFT

USE F-105 AIRCRAFT

## THUNDERSTORMS

1301 1302 2001 2003  
GS STORMS  
.STORMS (METEOROLOGY)  
..RAINSTORMS  
..#THUNDERSTORMS  
RT ANVIL CLOUDS

ARC CLOUDS  
ATMOSPHERICS  
CIRROCUMULUS CLOUDS  
CIRROSTRATUS CLOUDS  
CLOUDS (METEOROLOGY)  
COLD FRONTS  
CUMULONIMBUS CLOUDS  
DOWNBURSTS  
FRONTS (METEOROLOGY)  
HAIL  
HAILSTORMS  
LIGHTNING  
LIGHTNING SUPPRESSION  
MICROBURSTS (METEOROLOGY)  
RAIN  
STORM DAMAGE  
WARM FRONTS  
WIND (METEOROLOGY)

## THYMIDINE

0403 1808  
GS ACIDS  
#THYMIDINE  
BASES (CHEMICAL)  
#THYMIDINE  
ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
..HETEROCYCLIC COMPOUNDS  
...PYRIMIDINES  
...#THYMIDINE  
RT ALLOXAN  
DEOXYRIBONUCLEIC ACID  
NUCLEOSIDES

## THYMINE

0403 1808  
GS ACIDS  
#THYMINE  
NITROGEN COMPOUNDS  
#THYMINE  
ORGANIC COMPOUNDS  
.CYCLIC COMPOUNDS  
..HETEROCYCLIC COMPOUNDS  
...PYRIMIDINES  
...#THYMINE  
RT ALLOXAN  
DEOXYRIBONUCLEIC ACID

## THYMOL

0405 1808  
GS HYDROXYL COMPOUNDS  
.ALCOHOLS  
..PHENOLS  
..#THYMOL

## THYMUS GLAND

0404 0405  
GS ANATOMY  
.GLANDS (ANATOMY)  
..ENDOCRINE GLANDS  
..#THYMUS GLAND

## THYRATONS

2202 2403 2405 0905  
GS ELECTRON TUBES  
.GAS DISCHARGE TUBES  
..THYRATONS  
MICROWAVE EQUIPMENT  
#THYRATONS  
RECTIFIERS  
#THYRATONS  
RT CURRENT CONVERTERS (AC TO DC)  
SILICON CONTROLLED RECTIFIERS  
THYRISTORS

## THYRISTORS

0902 0905 0906  
GS ELECTRONIC EQUIPMENT  
.SOLID STATE DEVICES  
..SEMICONDUCTOR DEVICES  
..#THYRISTORS  
...SILICON CONTROLLED RECTIFIERS  
RECTIFIERS  
#THYRISTORS  
..SILICON CONTROLLED RECTIFIERS  
RT JUNCTION TRANSISTORS  
P-N-P-N JUNCTIONS  
THYRATONS  
TRIGGER CIRCUITS  
TRIODES

## THYROID GLAND

0405 0408  
GS ANATOMY  
.GLANDS (ANATOMY)  
..ENDOCRINE GLANDS  
..#THYROID GLAND  
RT CALCIUM METABOLISM  
HYPOMETABOLISM  
THYROXINE

## THYROXINE

0403 1808  
GS ACIDS  
.AMINO ACIDS  
..#THYROXINE  
ORGANIC COMPOUNDS  
.AMINO ACIDS  
..#THYROXINE  
SECRETIONS  
..ENDOCRINE SECRETIONS  
..HORMONES  
..#THYROXINE  
RT THYROID GLAND

## TIBET

1305  
GS NATIONS  
#TIBET  
RT ASIA  
BHUTAN  
HIMALAYAS

## TIBIA

0404 0405  
GS ANATOMY  
.MUSCULOSKELETAL SYSTEM  
..BONES  
..#TIBIA

RT LEG (ANATOMY)  
TIG WELDING  
USE GAS TUNGSTEN ARC WELDING

TID  
USE TRAVELING IONOSPHERIC DISTURBANCES

TIDAL FLATS  
1305 1306  
GS LANDFORMS  
. #TIDAL FLATS  
RT AQUICULTURE  
COASTS  
ESTUARIES  
FISHERIES  
MARSHLANDS  
MUD  
OCEANS  
SHORELINES  
TIDES

TIDAL OSCILLATION  
USE TIDES

TIDAL WAVES  
1308 2003  
GS WATER WAVES  
#TIDAL WAVES  
RT OCEAN CURRENTS  
OCEAN SURFACE  
OCEANOGRAPHY  
SEA BREEZE  
SEA ROUGHNESS  
SEISMOLOGY  
TSUNAMI WAVES  
% WAVES  
WIND (METEOROLOGY)

TIDE POWERED GENERATORS  
0301 0904 1310 2304  
RT ELECTRIC GENERATORS  
ENERGY CONVERSION EFFICIENCY  
% GENERATORS  
OCEAN CURRENTS  
OCEAN SURFACE  
OCEANOGRAPHY  
OCEANS  
SEA ROUGHNESS  
TIDEPOWER  
TIDES  
WATERWAVE ENERGY CONVERSION  
WATERWAVE POWERED MACHINES

TIDE POWERED MACHINES  
1310 1504 2308 3404  
RT % MACHINERY

OCEAN CURRENTS  
OCEAN SURFACE  
SEA ROUGHNESS  
TIDEPOWER  
TIDES  
WATERWAVE ENERGY CONVERSION  
WATERWAVE POWERED MACHINES  
WETLANDS

TIDEPOWER  
1301 1302 1310  
RT CLEAN ENERGY  
EARTH RESOURCES  
% ENERGY SOURCES  
OCEAN CURRENTS  
OCEAN SURFACE  
OCEANOGRAPHY  
SEA ROUGHNESS  
TIDE POWERED GENERATORS  
TIDE POWERED MACHINES  
TIDES  
WATERWAVE ENERGY  
WATERWAVE ENERGY CONVERSION  
WATERWAVE POWERED MACHINES

TIG WELDING  
USE GAS TUNGSTEN ARC WELDING

TIGHTNESS  
3408  
RT CLEARANCES  
CLOSURES  
PROXIMITY

TILES  
1801  
RT CERAMICS  
FLOORS  
GROUT  
LUDOX (TRADEMARK)  
MASONRY  
WALLS

TILT  
USE ATTITUDE (INCLINATION)

TILT ROTOR AIRCRAFT  
0201  
GS V/STOL AIRCRAFT  
. ROTARY WING AIRCRAFT  
. #TILT ROTOR AIRCRAFT  
. . . V-22 AIRCRAFT  
. . . XV-15 AIRCRAFT  
RT % AIRCRAFT  
HELICOPTERS  
TILTING ROTORS

TILT ROTOR RESEARCH AIRCRAFT PROGRAM  
0102 0104 0202 0206 3409  
GS PROGRAMS  
. NASA PROGRAMS  
. #TILT ROTOR RESEARCH AIRCRAFT  
PROGRAM  
RT % AIRCRAFT  
HELICOPTERS  
ROTARY WINGS  
V-22 AIRCRAFT  
XV-15 AIRCRAFT

TILT WING AIRCRAFT  
0104 0201 0209  
UF PIVOTED WING AIRCRAFT  
GS #TILT WING AIRCRAFT  
. CL-84 AIRCRAFT  
. L-29 JET TRAINER  
. VZ-2 AIRCRAFT  
. XC-142 AIRCRAFT  
RT % AIRCRAFT  
FAN IN WING AIRCRAFT  
RESEARCH AIRCRAFT

TIEBOLTS  
1504  
GS FASTENERS  
. BOLTS  
. #TIEBOLTS



# NASA THESAURUS HIERARCHICAL UPDATE

SHORT TAKEOFF AIRCRAFT  
V-22 AIRCRAFT  
V/STOL AIRCRAFT  
VERTICAL TAKEOFF AIRCRAFT  
X-22 AIRCRAFT

TILTED PROPELLERS  
O101 O102 O104  
GS PROPELLERS  
#TILTED PROPELLERS

RT HELICOPTER PROPELLER DRIVE

TILTING  
USE ATTITUDE (INCLINATION)

TILTING ROTORS  
O102 O104 O202 1504  
GS AIRFOILS

.WINGS  
..ROTARY WINGS  
..#TILTING ROTORS  
ROTATING BODIES  
.ROTORS

RT  
..ROTARY WINGS  
..#TILTING ROTORS  
TILT ROTOR AIRCRAFT  
V-22 AIRCRAFT  
XV-3 AIRCRAFT

TILTMETERS  
1306  
GS MEASURING INSTRUMENTS  
#TILTMETERS  
RT ATTITUDE (INCLINATION)  
GEOPHYSICS  
SEISMOGRAPHS

TIMBER IDENTIFICATION  
O409 3407  
GS IDENTIFYING  
#TIMBER IDENTIFICATION  
RECOGNITION  
#TIMBER IDENTIFICATION  
RT CONIFERS  
CROP IDENTIFICATION  
DECIDUOUS TREES  
EARTH RESOURCES  
EVALUATION  
FORESTS  
TREES (PLANTS)

TIMBER INVENTORY  
O409  
GS INVENTORIES  
#TIMBER INVENTORY

RT AERIAL PHOTOGRAPHY  
EARTH RESOURCES  
FOREST MANAGEMENT  
FORESTS  
INFRARED PHOTOGRAPHY  
PHOTOGRAPHY  
REFORESTATION  
SATELLITE-BORNE PHOTOGRAPHY  
TREES (PLANTS)

TIMBER VIGOR  
O409  
RT FOLIAGE  
FORESTS  
GROWTH  
TIMBERLINE  
TREES (PLANTS)

TIMBERLINE  
O409  
RT DENDROCHRONOLOGY  
FORESTS  
GROWTH  
HIGH ALTITUDE ENVIRONMENTS  
POLAR REGIONS  
TIMBER VIGOR  
TREES (PLANTS)

TIME  
2311 3406 3009  
UF DURATION  
GS #TIME  
.ACCESS TIME  
.BURNING TIME  
.DOWNTIME  
.EPHEMERIS TIME  
.FLIGHT TIME  
.MTBF  
.REACTION TIME  
.CHRONAXY  
.RELAXATION TIME  
.RESPONSE TIME (COMPUTERS)  
.SIDEREAL TIME  
.TESTING TIME  
.TRANSIT TIME  
.UNIVERSAL TIME  
CALENDARS  
CELESTIAL GEODESY  
CHRONOLOGY  
EXPOSURE  
INTERVALS  
LAUNCH DATES  
MONTH  
PROLONGATION  
RELATIVISTIC EFFECTS

SCHEDULES  
SYNCHRONISM  
TIME MEASUREMENT  
UNITS OF MEASUREMENT

TIME CONSTANT  
O603 1001 1406 2311  
GS CONSTANTS  
#TIME CONSTANT

RT  
..PERCEPTUAL TIME CONSTANT  
ACCESS TIME  
% CONSTANT

DAMPING  
DYNAMIC CHARACTERISTICS  
DYNAMIC RESPONSE  
IMPEDANCE  
LC CIRCUITS  
RC CIRCUITS  
REACTION TIME  
RELAXATION TIME  
RL CIRCUITS  
RLC CIRCUITS  
% TIME RESPONSE  
TRANSFER FUNCTIONS  
TRANSIENT RESPONSE

TIME DELAY  
USE TIME LAG

TIME DEPENDENCE  
1406 2402 2807 3501  
GS DEPENDENCE  
#TIME DEPENDENCE  
RT % HELMHOLTZ EQUATIONS  
SPATIAL DEPENDENCIES  
STOCHASTIC PROCESSES  
TEMPORAL DISTRIBUTION  
% TIME RESPONSE

TIME DISCRIMINATION  
O408 1409  
RT COMPARATOR CIRCUITS  
SENSORY DISCRIMINATION

TIME DIVISION MULTIPLE ACCESS  
O710  
UF TDMA  
GS TELECOMMUNICATION  
.MULTIPLE ACCESS  
.#TIME DIVISION MULTIPLE ACCESS  
.RADIO COMMUNICATION  
..RADIO RELAY SYSTEMS  
..#TIME DIVISION MULTIPLE ACCESS  
ALOHA SYSTEM  
CHANNEL NOISE

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FREQUENCY DIVISION MULTIPLE ACCESS
MULTICHANNEL COMMUNICATION
PACKET SWITCHING
PULSE COMMUNICATION
SATELLITE NETWORKS
SWITCHING
WIDEBAND COMMUNICATION

TIME DIVISION MULTIPLEXING
O702 0703 0802
GS
TRANSMISSION
MULTIPLEXING
.#TIME DIVISION MULTIPLEXING
RT DEMULTIPLEXING
FREQUENCY DIVISION MULTIPLEXING
PULSE MODULATION
TELEMETRY
TELEVISION TRANSMISSION
WAVELENGTH DIVISION MULTIPLEXING

TIME FUNCTIONS
1902 2311
GS FUNCTIONS (MATHEMATICS)
#TIME FUNCTIONS
RT RATES (PER TIME)
SQUARE WAVES
STOCHASTIC PROCESSES
WAVE FUNCTIONS
WAVEFORMS
WAVELET ANALYSIS

TIME LAG
O408 1406 2402 2807
UF CHRONOTRONS
LAG (DELAY)
TIME DELAY
RT CEPSTRAL ANALYSIS
DELAY
DELAY LINES
ELECTRIC RELAYS
HYSTERESIS
INVENTORY CONTROLS
REACTION TIME
REFRACTORY PERIOD
RESPONSES
SCHEDULES
% TIME RESPONSE
TRANSMISSION RATE (COMMUNICATIONS)

TIME LAPSE PHOTOGRAPHY
USE CHRONOPHOTOGRAPHY

TIME MARCHING
O502 3501
RT FINITE DIFFERENCE THEORY

NUMERICAL ANALYSIS
SPATIAL MARCHING

TIME MEASUREMENT
1406
UF DATING
EPOCHS
TIMING
GS #TIME MEASUREMENT
.CLOCK PARADOX
RT ATOMIC CLOCKS
CHRONOMETERS
CLOCKS
CONSECUTIVE EVENTS
FREQUENCY MEASUREMENT
MEASUREMENT
OSCILLOGRAPHS
RADIOACTIVE AGE DETERMINATION
RATES (PER TIME)
SIDEREAL TIME
STROBOSCOPES
SYNCHRONISM
% TIME RESPONSE
TIMING DEVICES
VELOCITY
VELOCITY MEASUREMENT
WINDOWS (INTERVALS)

TIME MEASURING INSTRUMENTS
1406
GS MEASURING INSTRUMENTS
#TIME MEASURING INSTRUMENTS
...CLOCKS
...ATOMIC CLOCKS
...AUTONOMOUS SPACECRAFT CLOCKS
...CHRONOMETERS
...TIMING DEVICES

TIME OF FLIGHT SPECTROMETERS
1406 2311
GS MEASURING INSTRUMENTS
SPECTROMETERS
.#TIME OF FLIGHT SPECTROMETERS
RT SPECTROSCOPY

TIME OPTIMAL CONTROL
O802 0803 1902
GS AUTOMATIC CONTROL
.OPTIMAL CONTROL
.#TIME OPTIMAL CONTROL
OPTIMIZATION
.OPTIMAL CONTROL
.#TIME OPTIMAL CONTROL
RT % CONTROL

% TIME RESPONSE
O408 1003
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT ACCESS TIME
DELAY
RESPONSE BIAS
RESPONSES
TEMPORAL DISTRIBUTION
TIME CONSTANT
TIME DEPENDENCE
TIME LAG
TIME MEASUREMENT

TIME SERIES ANALYSIS
O802 1902
RT % APPLICATIONS OF MATHEMATICS
AUTOCORRELATION
CORRELATION
CURVE FITTING
DATA SAMPLING
EXTRAPOLATION
FORECASTING
FOURIER ANALYSIS
KALMAN-SCHMIDT FILTERING
MAXIMUM ENTROPY METHOD
SCHEDULING
% STATISTICS
STOCHASTIC PROCESSES
TREND ANALYSIS
TRENDS

TIME SHARING
O802 0803
RT COMPUTER PROGRAMMING
COORDINATION
MULTIPLE OUTPUT PROGRAMS
MULTIPROGRAMMING
PIPELINING (COMPUTERS)
RUN TIME (COMPUTERS)

TIME SIGNALS
O702 0705
RT CLOCK PARADOX
FREQUENCY STANDARDS
PICOSECOND PULSES
PULSE DURATION
% SIGNALS
TIMING DEVICES

TIME TEMPERATURE PARAMETER
2311
RT AGING (METALLURGY)

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# NASA THESAURUS HIERARCHICAL UPDATE

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AUSTENITIC STAINLESS STEELS
EMBRTITLEMENT
FRACTURE MECHANICS
LONG TERM EFFECTS
METALLOGRAPHY
PRECIPITATION HARDENING
TEMPERATURE EFFECTS

TIMERS
USE TIMING DEVICES

TIMING
USE TIME MEASUREMENT

TIMING DEVICES
1402 1406 1410
UF TIMERS
GS MEASURING INSTRUMENTS
.TIME MEASURING INSTRUMENTS
.#TIMING DEVICES
CHRONOMETERS
CLOCK PARADOX
CLOCKS
DWELL
PENDULUMS
TACHOMETERS
TIME MEASUREMENT
TIME SIGNALS

TIMOSHENKO BEAMS
3202
GS STRUCTURAL MEMBERS
.BEAMS (SUPPORTS)
.#TIMOSHENKO BEAMS
COLUMNS (SUPPORTS)
TRUSSES

TIN
1703
GS CHEMICAL ELEMENTS
#TIN
..TIN ISOTOPES
METALS
#TIN
..TIN ISOTOPES

TIN ALLOYS
1701 1704
GS ALLOYS
#TIN ALLOYS
..BABBITT METAL
BEARING ALLOYS
BISMUTH ALLOYS
INDIUM ALLOYS
SOLDERS

STANNIDES
ZIRCALOYS (TRADEMARK)

TIN COMPOUNDS
O603
GS #TIN COMPOUNDS
.ORGANIC TIN COMPOUNDS
.STANNATES
.STANNIDES
.NIOBIUM STANNIDES
.TIN OXIDES
.TIN TELLURIDES
RT % CHEMICAL COMPOUNDS
% GROUP 4A COMPOUNDS
% METAL COMPOUNDS

TIN ISOTOPES
O603 1703 1704 2406
GS CHEMICAL ELEMENTS
.NUCLIDES
..ISOTOPES
..#TIN ISOTOPES
.TIN
.#TIN ISOTOPES
METALS
.TIN
.#TIN ISOTOPES

TIN OXIDES
O603 1804
GS CHALCOGENIDES
.OXIDES
..METAL OXIDES
..#TIN OXIDES
TIN COMPOUNDS
#TIN OXIDES
RT SIS (SEMICONDUCTORS)

TIN TELLURIDES
1704 1804
GS CHALCOGENIDES
.TELLURIDES
.#TIN TELLURIDES
TELLURIUM COMPOUNDS
.TELLURIDES
.#TIN TELLURIDES
TIN COMPOUNDS
#TIN TELLURIDES

TIP DRIVEN ROTORS
O104 2805
UF HOT CYCLE PROPULSION SYSTEM
GS AIRFOILS
.WINGS
..ROTARY WINGS

..#TIP DRIVEN ROTORS
ROTATING BODIES
.ROTORS
..ROTARY WINGS
..#TIP DRIVEN ROTORS
RT XV-9A AIRCRAFT

TIP SPEED
O101 O102 O104 O201
GS RATES (PER TIME)
#TIP SPEED
VELOCITY
#TIP SPEED
RT ANGULAR VELOCITY
CRITICAL VELOCITY
ROTOR SPEED

TIP VANES
O204
GS ROTATING BODIES
.ROTORS
.#TIP VANES
TURBOMACHINERY
.TURBINES
..WIND TURBINES
..#TIP VANES

TIPS
O102 O104
GS #TIPS
.BLADE TIPS
.CRACK TIPS
.NOSE TIPS
.WING TIPS
RT AIRFOIL PROFILES
EDGES

TIRES
O203 3202
GS #TIRES
.AIRCRAFT TIRES
RT BLOWOUTS
INFLATABLE STRUCTURES
LANDING GEAR
ROLLERS
TOROIDAL WHEELS
TREADS
VEHICLE WHEELS
WHEEL BRAKES
WHEELS

TIROS D SATELLITE
USE TIROS 4 SATELLITE

TIROS E SATELLITE

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|                   |                            |                             |                            |
|-------------------|----------------------------|-----------------------------|----------------------------|
| USE               | TIROS 5 SATELLITE          | ..#TIROS PROJECT            | TIROS 3 SATELLITE          |
|                   |                            | .PROJECTS                   | 2003 2004 3107             |
| TIROS F SATELLITE |                            | ..#TIROS PROJECT            | GS                         |
| USE               | TIROS 6 SATELLITE          | .SPACE PROGRAMS             | ARTIFICIAL SATELLITES      |
|                   |                            | ..NASA SPACE PROGRAMS       | .METEOROLOGICAL SATELLITES |
| TIROS G SATELLITE |                            | ..#TIROS PROJECT            | ..TIROS SATELLITES         |
| USE               | TIROS 7 SATELLITE          | CLOUD PHOTOGRAPHS           | ..#TIROS 3 SATELLITE       |
|                   |                            | CLOUD PHOTOGRAPHY           | RT                         |
| TIROS H SATELLITE |                            | METEOROLOGICAL SATELLITES   | DELTA LAUNCH VEHICLE       |
| USE               | TIROS 8 SATELLITE          |                             |                            |
|                   |                            |                             |                            |
| TIROS M           |                            |                             |                            |
| 2003 2004 3107    |                            | TIROS SATELLITES            | TIROS 4 SATELLITE          |
| GS                | ARTIFICIAL SATELLITES      | 2003 2004 3107 3409         | 2003 2004 3107             |
|                   | .METEOROLOGICAL SATELLITES | GS                          | UF                         |
|                   | ..TIROS SATELLITES         | ARTIFICIAL SATELLITES       | TIROS D SATELLITE          |
|                   | ..#TIROS M                 | .METEOROLOGICAL SATELLITES  | GS                         |
| RT                | ITOS SATELLITES            | ..#TIROS SATELLITES         | ARTIFICIAL SATELLITES      |
|                   | ..#TIROS 1                 | ..ITOS SATELLITES           | .METEOROLOGICAL SATELLITES |
|                   | ..#TIROS 2                 | ....ITOS 1                  | ..TIROS SATELLITES         |
|                   | ..#TIROS 3                 | ....ITOS 2                  | ..#TIROS 4 SATELLITE       |
|                   | ..#TIROS 4                 | ....ITOS 3                  | RT                         |
|                   | ..#TIROS M                 | ....ITOS 4                  | DELTA LAUNCH VEHICLE       |
|                   | ..#TIROS N                 | ....TIROS M                 |                            |
|                   | ..#TIROS 1                 | ..TIROS N SERIES SATELLITES |                            |
|                   | ..#TIROS 2                 | ...TIROS 1 SATELLITE        |                            |
|                   | ..#TIROS 3                 | ...TIROS 2 SATELLITE        |                            |
|                   | ..#TIROS 4                 | ...TIROS 3 SATELLITE        |                            |
|                   | ..#TIROS M                 | ...TIROS 4 SATELLITE        |                            |
|                   | ..#TIROS N                 | ...TIROS 5 SATELLITE        |                            |
|                   | ..#TIROS 1                 | ...TIROS 6 SATELLITE        |                            |
|                   | ..#TIROS 2                 | ...TIROS 7 SATELLITE        |                            |
|                   | ..#TIROS 3                 | ...TIROS 8 SATELLITE        |                            |
|                   | ..#TIROS 4                 | ...TIROS 9 SATELLITE        |                            |
|                   | ..#TIROS M                 | ...TIROS 10 SATELLITE       |                            |
|                   | ..#TIROS N                 | CLOUD PHOTOGRAPHY           |                            |
|                   | ..#TIROS 1                 | ESSA SATELLITES             |                            |
|                   | ..#TIROS 2                 | POLAR ORBITS                |                            |
|                   | ..#TIROS 3                 | SATELLITE OBSERVATION       |                            |
|                   | ..#TIROS 4                 |                             |                            |
|                   | ..#TIROS M                 |                             |                            |
|                   | ..#TIROS N                 |                             |                            |
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|                   | ..#TIROS 4                 |                             |                            |
|                   | ..#TIROS M                 |                             |                            |
|                   | ..#TIROS N                 |                             |                            |
|                   | ..#TIROS 1                 |                             |                            |
|                   | ..#TIROS 2                 |                             |                            |
|                   | ..#TIROS 3                 |                             |                            |
|                   | ..#TIROS 4                 |                             |                            |
|                   | ..#TIROS M                 |                             |                            |
|                   | ..#TIROS N                 |                             |                            |
|                   | ..#TIROS 1                 |                             |                            |
|                   | ..#TIROS 2                 |                             |                            |
|                   | ..#TIROS 3                 |                             |                            |
|                   | ..#TIROS 4                 |                             |                            |
|                   | ..#TIROS M                 |                             |                            |
|                   |                            |                             |                            |

|      |                            |      |                 |      |                               |                              |      |
|------|----------------------------|------|-----------------|------|-------------------------------|------------------------------|------|
| 2003 | 2004                       | 3107 | SATURN (PLANET) | 3101 | 3103                          | 3401                         | 3409 |
| UF   | TIROS WHEEL SATELLITE      |      | TRITON          | GS   | PROGRAMS                      |                              |      |
| GS   | ARTIFICIAL SATELLITES      |      |                 |      | .NASA PROGRAMS                |                              |      |
|      | .METEOROLOGICAL SATELLITES |      |                 |      | ..NASA SPACE PROGRAMS         |                              |      |
|      | ..TIROS SATELLITES         |      |                 |      | ..#TITAN PROJECT              |                              |      |
|      | ..#TIROS 9 SATELLITE       |      |                 |      | .PROJECTS                     |                              |      |
| RT   | DELTA LAUNCH VEHICLE       |      |                 |      | ..#TITAN PROJECT              |                              |      |
|      |                            |      |                 |      | .SPACE PROGRAMS               |                              |      |
|      |                            |      |                 |      | ..NASA SPACE PROGRAMS         |                              |      |
|      |                            |      |                 |      | ..#TITAN PROJECT              |                              |      |
|      |                            |      |                 |      | RT % BOOSTERS                 |                              |      |
|      |                            |      |                 |      | GEMINI PROJECT                |                              |      |
|      |                            |      |                 |      | GEMINI SPACECRAFT             |                              |      |
|      |                            |      |                 |      | LAUNCH VEHICLES               |                              |      |
|      |                            |      |                 |      | LAUNCHERS                     |                              |      |
|      |                            |      |                 |      | LAUNCHING                     |                              |      |
|      |                            |      |                 |      |                               |                              |      |
|      |                            |      |                 |      | TITAN 1 ICBM                  |                              |      |
|      |                            |      |                 |      | 3101                          | 3103                         | 3401 |
|      |                            |      |                 |      | UF                            | SM-68 MISSILE                |      |
|      |                            |      |                 |      | GS                            | MISSILES                     |      |
|      |                            |      |                 |      |                               | .BALLISTIC MISSILES          |      |
|      |                            |      |                 |      |                               | ..INTERCONTINENTAL BALLISTIC |      |
|      |                            |      |                 |      |                               | MISSILES                     |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      | ..INTERCONTINENTAL BALLISTIC  |                              |      |
|      |                            |      |                 |      | MISSILES                      |                              |      |
|      |                            |      |                 |      | ...TITAN ICBM                 |                              |      |
|      |                            |      |                 |      | ...#TITAN 1 ICBM              |                              |      |
|      |                            |      |                 |      | ..SURFACE TO SURFACE MISSILES |                              |      |
|      |                            |      |                 |      |                               |                              |      |

|    |                                                                                                                                                                                                                                                                                    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                                                                                                                                                                                                                                                                       |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | MULTISTAGE ROCKET VEHICLES<br>..TITAN LAUNCH VEHICLES<br>..#TITAN 3 LAUNCH VEHICLE<br>MANNED ORBITAL LABORATORIES                                                                                                                                                                  | RT | #TITANIUM ALLOYS<br>..NITINOL ALLOYS<br>ALUMINIDES<br>SHAPE MEMORY ALLOYS<br>VANADIUM ALLOYS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | RT | % CHEMICAL COMPOUNDS<br>% GROUP 4B COMPOUNDS<br>% METAL COMPOUNDS                                                                                                                                                                                                     |
| RT | TITAN 4 LAUNCH VEHICLE<br>3101 3103 3409<br>GS LAUNCH VEHICLES<br>..TITAN LAUNCH VEHICLES<br>..#TITAN 4 LAUNCH VEHICLE<br>ROCKET VEHICLES<br>MULTISTAGE ROCKET VEHICLES<br>..TITAN LAUNCH VEHICLES<br>..#TITAN 4 LAUNCH VEHICLE<br>TITAN CENTAUR LAUNCH VEHICLE<br>% VEHICLES      | RT | TITANIUM BORIDES<br>O603 1804<br>GS BORON COMPOUNDS<br>..BORIDES<br>..#TITANIUM BORIDES<br>TITANIUM COMPOUNDS<br>#TITANIUM BORIDES<br>TITANIUM CARBIDES<br>O603 1804<br>GS CARBON COMPOUNDS<br>..CARBIDES<br>..#TITANIUM CARBIDES<br>TITANIUM COMPOUNDS<br>#TITANIUM CARBIDES<br>CERAMIC FIBERS<br>CERAMIC MATRIX COMPOSITES                                                                                                                                                                                                                                                                                                                   | RT | TITANIUM DIOXIDE<br>USE TITANIUM OXIDES<br>TITANIUM ISOTOPES<br>O603 1703 2406<br>GS CHEMICAL ELEMENTS<br>..NUCLIDES<br>..ISOTOPES<br>..#TITANIUM ISOTOPES<br>..TITANIUM<br>..#TITANIUM ISOTOPES<br>METALS<br>TRANSITION METALS<br>..TITANIUM<br>..#TITANIUM ISOTOPES |
| RT | TITANATES<br>O603<br>GS TITANIUM COMPOUNDS<br>#TITANATES<br>..BARIUM TITANATES<br>..ILMENITE<br>..LEAD TITANATES<br>..MAGNESIUM TITANATES<br>..PEROVSKITES<br>..PIEZOELECTRIC CERAMICS<br>..LEAD ZIRCONATE TITANATES<br>..STRONTIUM TITANATES<br>..ZIRCONIUM TITANATES<br>EUXENITE | RT | TITANIUM CHLORIDES<br>O603 1804<br>GS HALOGEN COMPOUNDS<br>..CHLORINE COMPOUNDS<br>..CHLORIDES<br>..#TITANIUM CHLORIDES<br>..HALIDES<br>..CHLORIDES<br>..#TITANIUM CHLORIDES<br>..METAL HALIDES<br>..#TITANIUM CHLORIDES<br>TITANIUM COMPOUNDS<br>#TITANIUM CHLORIDES<br>TITANIUM COMPOUNDS<br>O603<br>GS #TITANIUM COMPOUNDS<br>..TITANATES<br>..BARIUM TITANATES<br>..ILMENITE<br>..LEAD TITANATES<br>..MAGNESIUM TITANATES<br>..PEROVSKITES<br>..PIEZOELECTRIC CERAMICS<br>..LEAD ZIRCONATE TITANATES<br>..STRONTIUM TITANATES<br>..ZIRCONIUM TITANATES<br>TITANIUM BORIDES<br>TITANIUM CARBIDES<br>TITANIUM CHLORIDES<br>TITANIUM NITRIDES | RT | TITANIUM NITRIDES<br>O603 1804<br>GS NITROGEN COMPOUNDS<br>..NITRIDES<br>..METAL NITRIDES<br>..#TITANIUM NITRIDES<br>TITANIUM COMPOUNDS<br>#TITANIUM NITRIDES<br>CERAMIC MATRIX COMPOSITES                                                                            |
| RT | TITANIA<br>1901 3001 3007 3008<br>GS CELESTIAL BODIES<br>NATURAL SATELLITES<br>..ICY SATELLITES<br>..#TITANIA<br>..URANUS SATELLITES<br>..#TITANIA<br>URANUS (PLANET)                                                                                                              | RT | TITANIUM COMPOUNDS<br>O603<br>GS #TITANIUM COMPOUNDS<br>..TITANATES<br>..BARIUM TITANATES<br>..ILMENITE<br>..LEAD TITANATES<br>..MAGNESIUM TITANATES<br>..PEROVSKITES<br>..PIEZOELECTRIC CERAMICS<br>..LEAD ZIRCONATE TITANATES<br>..STRONTIUM TITANATES<br>..ZIRCONIUM TITANATES<br>TITANIUM BORIDES<br>TITANIUM CARBIDES<br>TITANIUM CHLORIDES<br>TITANIUM NITRIDES                                                                                                                                                                                                                                                                          | RT | TITANIUM OXIDES<br>O603 1804<br>UF TITANIUM DIOXIDE<br>GS CHALCOGENIDES<br>..OXIDES<br>..METAL OXIDES<br>..#TITANIUM OXIDES<br>..ANATASE<br>..ILMENITE<br>..RUTILE<br>TITANIUM COMPOUNDS<br>#TITANIUM OXIDES<br>..ANATASE<br>..ILMENITE<br>..RUTILE<br>DIOXIDES       |
| RT | TITANIUM<br>O603 1703<br>GS CHEMICAL ELEMENTS<br>#TITANIUM<br>TITANIUM ISOTOPES<br>METALS<br>TRANSITION METALS<br>#TITANIUM<br>..TITANIUM ISOTOPES                                                                                                                                 | RT | TITANIUM ALLOYS<br>1701<br>GS ALLOYS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RT | TITRATION<br>O601 O603<br>GS CHEMICAL REACTIONS<br>#TITRATION                                                                                                                                                                                                         |

## NASA THESAURUS HIERARCHICAL UPDATE

|                       |                                                                                                                                                                                  |                                                                                                                                                                                                                           |                                                                                                                                                                                                                |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                    | ACIDITY<br>COULOMETERS<br>IODIMETRY<br>ION CONCENTRATION<br>KJELDAHL METHOD<br>SOLUTIONS                                                                                         | BEAM INJECTION<br>BETA FACTOR<br>BUMPY TORUSES<br>% ELECTRIC POWER<br>LIMITERS (FUSION REACTORS)<br>NUCLEAR FUSION<br>PLASMA COMPRESSION<br>PLASMA CONTROL<br>PLASMA PHYSICS<br>POLOIDAL FLUX<br>% REACTORS<br>SPHEROMAKS | ORTHOSTATIC TOLERANCE<br>PHYSIOLOGY<br>RANGE (EXTREMES)<br>% RESISTANCE                                                                                                                                        |
| TITRIMETERS           | O601 O604 1406<br>GS MEASURING INSTRUMENTS<br>#TITRIMETERS                                                                                                                       |                                                                                                                                                                                                                           | TOLLMIEN-SCHLICHTING WAVES<br>O101 O710 1202 1203<br>GS ELASTIC WAVES<br>#TOLLMIEN-SCHLICHTING WAVES<br>RT BLASIUS FLOW<br>BOUNDARY LAYER FLOW<br>BOUNDARY LAYER TRANSITION<br>LAMINAR FLOW<br>TURBULENT FLOW  |
| RT                    | CHEMICAL ANALYSIS                                                                                                                                                                |                                                                                                                                                                                                                           |                                                                                                                                                                                                                |
| TNT (TRINITROTOLUENE) | USE TRINITROTOLUENE                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                                                |
| TOBACCO               | O409<br>GS PLANTS (BOTANY)<br>#TOBACCO<br>RT NICOTINE                                                                                                                            |                                                                                                                                                                                                                           | TOLUENE<br>1808 2701 3302<br>GS ORGANIC COMPOUNDS<br>.HYDROCARBONS<br>. #TOLUENE<br>RT SOLVENTS<br>XYLENE                                                                                                      |
| TOCOPHEROL            | O403 O405 1808<br>UF VITAMIN E<br>GS ORGANIC COMPOUNDS<br>.CYCLIC COMPOUNDS<br>..HETEROCYCLIC COMPOUNDS<br>.. #TOCOPHEROL<br>.LIPIDS<br>. #TOCOPHEROL<br>VITAMINS<br>#TOCOPHEROL |                                                                                                                                                                                                                           | TOMAHAWK MISSILES<br>3106<br>GS MISSILES<br>.SURFACE TO SURFACE MISSILES<br>..CRUISE MISSILES<br>.. #TOMAHAWK MISSILES<br>RT WEAPONS                                                                           |
| TOGO                  | 1305<br>GS NATIONS<br>#TOGO<br>RT AFRICA                                                                                                                                         |                                                                                                                                                                                                                           | TOMATOES<br>O409 O505<br>GS FARM CROPS<br>#TOMATOES<br>RT AGRICULTURE<br>BOTANY<br>% CROPS<br>% FOOD<br>SEEDS                                                                                                  |
| TOILETS               | O504<br>RT HUMAN WASTES<br>SANITATION<br>SPACECREWS<br>WASTE DISPOSAL                                                                                                            |                                                                                                                                                                                                                           | TOMBOLOS<br>USE BARS (LANDFORMS)                                                                                                                                                                               |
| TOKAMAK DEVICES       | 2203 2502<br>GS NUCLEAR REACTORS<br>#TOKAMAK DEVICES<br>..JOINT EUROPEAN TORUS<br>PLASMA GENERATORS<br>#TOKAMAK DEVICES<br>..JOINT EUROPEAN TORUS                                |                                                                                                                                                                                                                           | TOMOGRAPHY<br>1407<br>UF PLANIGRAPHY<br>GS IMAGERY<br>. RADIOGRAPHY<br>. #TOMOGRAPHY<br>...COMPUTER AIDED TOMOGRAPHY<br>RT COMPUTER GRAPHICS<br>IMAGE ENHANCEMENT<br>OPTICAL DATA PROCESSING<br>X RAY ANALYSIS |

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## NASA THESAURUS HIERARCHICAL UPDATE

|                                  |     |               |                                |
|----------------------------------|-----|---------------|--------------------------------|
| ..IMBEDDINGS (MATHEMATICS)       | USE | MRCA AIRCRAFT | BUMPY TORUSES                  |
| ...INVARIANT IMBEDDINGS          |     |               | ELLIPTICAL PLASMAS             |
| ..LINKS (MATHEMATICS)            |     |               | LIMITERS (FUSION REACTORS)     |
| ..METRIC SPACE                   |     |               | PLASMA CONTROL                 |
| RT CATASTROPHE THEORY            |     |               | PLASMA CURRENTS                |
| % CELLS                          |     |               | POLOIDAL FLUX                  |
| CONTINUITY                       |     |               | REVERSE FIELD PINCH            |
| CONTINUITY (MATHEMATICS)         |     |               | % RINGS                        |
| CONTINUUMS                       |     |               | ROTATING PLASMAS               |
| DEFORMATION                      | RT  |               | SOLENOIDS                      |
| DIMENSIONS                       |     |               | SPHEROMAKS                     |
| FAULT TREES                      |     |               | STELLARATORS                   |
| FIBERS (MATHEMATICS)             |     |               |                                |
| GRAPH THEORY                     |     |               | TOROIDAL SHELLS                |
| HOMOLOGY                         |     |               | O102 3109 3203                 |
| HOMOTROPY                        |     |               | GS SHELLS (STRUCTURAL FORMS)   |
| INTERVALS                        |     |               | #TOROIDAL SHELLS               |
| ISOPERIMETRIC PROBLEM            |     |               | RT METAL SHELLS                |
| MANIFOLDS (MATHEMATICS)          |     |               | REINFORCED SHELLS              |
| MAPPING                          |     |               | SKIN (STRUCTURAL MEMBER)       |
| NETWORK SYNTHESIS                |     |               | THIN WALLED SHELLS             |
| % NETWORKS                       |     |               | TOROIDS                        |
| SHAPES                           |     |               |                                |
| SWITCHING THEORY                 |     |               | TOROIDAL WHEELS                |
| TORUSES                          |     |               | 1504                           |
| TREES (MATHEMATICS)              |     |               | UF                             |
|                                  |     |               | GS DOUGHNUT SHAPE WHEELS       |
| TOPPING CYCLE ENGINES            |     |               | WHEELS                         |
| O301                             |     |               | #TOROIDAL WHEELS               |
| RT AIRCRAFT ENGINES              |     |               | RT ROVING VEHICLES             |
| LIQUID HYDROGEN                  |     |               | SUSPENSION SYSTEMS (VEHICLES)  |
| PROPULSION SYSTEM CONFIGURATIONS |     |               | TIRES                          |
|                                  |     |               | VEHICLE WHEELS                 |
|                                  |     |               |                                |
| TOPS (SPACECRAFT)                |     |               | TOROIDS                        |
| 3007 3107 3110                   |     |               | O904 O905                      |
| UF THERMOELECTRIC OUTER PLANET   |     |               | RT % COILS                     |
| SPACECRAFT                       |     |               | % CURVES                       |
| THERMOELECTRIC SPACECRAFT        |     |               | GEOMETRY                       |
| GS INTERPLANETARY SPACECRAFT     |     |               | INDUCTORS                      |
| #TOPS (SPACECRAFT)               |     |               | ION IMPACT                     |
| RT FLYBY MISSIONS                |     |               | MAGNET COILS                   |
| INTERPLANETARY FLIGHT            |     |               | MAGNETIC CORES                 |
| OUTER PLANETS EXPLORERS          |     |               | TOROIDAL SHELLS                |
| SPACE EXPLORATION                |     |               | TRANSFORMERS                   |
| SPACE MISSIONS                   |     |               |                                |
| % SPACECRAFT                     |     |               |                                |
|                                  |     |               | TORPEDO ENGINES                |
| TORCHES                          |     |               | 3101 3401                      |
| 1507 2501 3303                   |     |               | GS ENGINES                     |
| RT CUTTING                       |     |               | #TORPEDO ENGINES               |
| PYROGEN                          |     |               | ..TURBOROCKET ENGINES          |
| WELDING                          |     |               | ..ULLAGE ROCKET ENGINES        |
| WELDING MACHINES                 |     |               | ..VERNIER ENGINES              |
|                                  |     |               | ...CONTROL ROCKETS             |
|                                  |     |               | ...SYNCOM APOGEE ENGINES       |
| TORNADO AIRCRAFT                 |     |               | RT INTERNAL COMBUSTION ENGINES |

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# NASA THESAURUS HIERARCHICAL UPDATE

POLLUTION  
RED TIDE  
TOXIC DISEASES  
TOXICITY  
VACCINES

TOXINS AND ANTIPOXINS

O405 0412  
GS #TOXINS AND ANTIPOXINS  
.ENDOTOXINS

.POLYBROMINATED BIPHENYLS  
TOXICITY  
VACCINES

TQM (QUALITY CONTROL)

USE TOTAL QUALITY MANAGEMENT

TRAAC SATELLITE

USE TRANSIT ATTITUDE CONTROL SATELLITE

TRACE CONTAMINANTS

O411 2603  
GS CONTAMINANTS  
#TRACE CONTAMINANTS  
RT CHEMICAL ELEMENTS  
IMPURITIES  
POLLUTION TRANSPORT  
PURITY

% TRACING

TRACE ELEMENTS

O404 0603  
RT ISOTOPIC LABELING  
% NUTRIENTS  
PARTICLE TRACKS  
% TRACERS  
% TRACING

% TRACERS

O405 0501 0601 0603  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

RT AMMUNITION  
ISOTOPIC LABELING  
MARKING  
TRACE ELEMENTS

TRACHEA

O404  
GS ANATOMY  
.RESPIRATORY SYSTEM  
.#TRACHEA  
RT BRONCHI

% TUBES

TRACHYTE  
1305 1306  
GS ROCKS  
.IGNEOUS ROCKS  
.#TRACHYTE  
RT SOILS  
SYENITE

% TRACING

O404 0601 0602 2406  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT DRAWINGS  
TRACE CONTAMINANTS  
TRACE ELEMENTS

TRACKED VEHICLES

2102  
GS SURFACE VEHICLES  
.MOTOR VEHICLES  
..TRACTORS  
..#TRACKED VEHICLES  
RT CRAWLER TRACTORS  
VEHICLES  
VEHICULAR TRACKS

TRACKING (POSITION)

O702 0709 1003 1109 3006 3407 3009  
UF TARGET TRACKING  
TRACKING STUDIES  
GS #TRACKING (POSITION)  
.COMPENSATORY TRACKING  
.INFRARED TRACKING  
.MISSILE TRACKING  
.MULTIPLE TARGET TRACKING  
.OPTICAL TRACKING  
.PHOTOGRAPHIC TRACKING  
.POLYSTATION DOPPLER TRACKING  
SYSTEM  
.PURSUIT TRACKING  
.RADAR TRACKING  
.RADIO TRACKING  
..WILDLIFE RADIOLOCATION  
..RANGE AND RANGE RATE TRACKING  
.SPACE DETECTION AND TRACKING  
SYSTEM  
.SPACECRAFT TRACKING  
..SATELLITE TRACKING  
...SATELLITE-TO-SATELLITE TRACKING  
..STAR TRACKERS  
..CCD STAR TRACKER  
..VIDEO LANDMARK ACQUISITION AND

TRACKING  
RT AIR TRAFFIC CONTROL  
AIRCRAFT DETECTION  
APPROACH CONTROL  
DETECTION  
IDENTIFYING  
INSTRUMENT LANDING SYSTEMS  
LASER RANGER/TRACKER  
MULTISPECTRAL TRACKING TELESCOPES  
POSITION (LOCATION)  
RANGEFINDING  
RAY TRACKING  
SATELLITE DOPPLER POSITIONING  
SOLAR SENSORS  
SOUND LOCALIZATION  
SOUND RANGING  
TRACKING PROBLEM  
% TRACKS

TRACKING AND DATA RELAY SATELLITES

USE TDR SATELLITES

TRACKING ANTENNAS

USE DIRECTIONAL ANTENNAS

TRACKING FILTERS

O701 0709 0905  
GS ELECTROMAGNETIC WAVE FILTERS  
.BANDPASS FILTERS  
.#TRACKING FILTERS  
.ELECTRIC FILTERS  
.#TRACKING FILTERS  
RT ADAPTIVE FILTERS  
BANDSTOP FILTERS  
BANDWIDTH  
MULTIPLE TARGET TRACKING  
PHASE LOCKED SYSTEMS  
VIDEO LANDMARK ACQUISITION AND  
TRACKING

TRACKING NETWORKS

O702 0709 1109  
GS #TRACKING NETWORKS  
.DEEP SPACE NETWORK  
.GLOBAL TRACKING NETWORK  
.MANNED SPACE FLIGHT NETWORK  
.MATS (SYSTEMS)  
.POLYSTATION DOPPLER TRACKING  
SYSTEM  
.RADAR NETWORKS  
.SPACE DETECTION AND TRACKING  
SYSTEM  
.SPACE FLIGHT TRACKING AND DATA  
NETWORK  
..STON (NETWORK)

RT ADVANCED RANGE INSTRUMENTATION SHIP  
 DATA ACQUISITION  
 GROUND SUPPORT EQUIPMENT  
 MINITRACK SYSTEM  
 MISSILE TRACKING  
 % NETWORKS  
 ORION (RADIO INTERFEROMETRY NETWORK)  
 SATELLITE TRACKING  
 SATELLITE-TO-SATELLITE TRACKING  
 SPACECRAFT TRACKING

TRACKING PROBLEM  
 0709  
 RT AUTOMATIC CONTROL  
 CONTROL THEORY  
 FEEDBACK CONTROL  
 LINEAR SYSTEMS  
 MULTIPLE TARGET TRACKING  
 NONLINEAR SYSTEMS  
 OPTIMAL CONTROL  
 OUTPUT  
 % PROBLEMS  
 TRACKING (POSITION)  
 TRAJECTORY CONTROL  
 TRAJECTORY OPTIMIZATION

TRACKING RADAR  
 0705 0709 1109  
 GS RADAR  
 #TRACKING RADAR  
 ..COBRA DANE (RADAR)  
 COHERENT RADAR  
 CONTINUOUS WAVE RADAR  
 DIGITAL RADAR SYSTEMS  
 MONOPULSE RADAR  
 PULSE RADAR  
 RADAR TRACKING  
 SATELLITE-BORNE RADAR  
 SEARCH RADAR  
 SURVEILLANCE RADAR  
 TRADEX RADAR SYSTEM  
 TRAJECTORY MEASUREMENT

TRACKING STATIONS  
 0709 1109  
 GS STATIONS  
 #TRACKING STATIONS  
 ..DEEP SPACE INSTRUMENTATION FACILITY  
 ..GLOBAL TRACKING NETWORK  
 ..POLYSTATION DOPPLER TRACKING SYSTEM  
 ..SPACE DETECTION AND TRACKING SYSTEM

..STDN (NETWORK)  
 RT % FENCES  
 GROUND STATIONS  
 GROUND SUPPORT EQUIPMENT  
 JODRELL BANK OBSERVATORY  
 % MARS  
 MINITRACK SYSTEM  
 MISSILE TRACKING  
 RADAR NETWORKS  
 SATELLITE TRACKING  
 SPACE FLIGHT TRACKING AND DATA NETWORK  
 SPACECRAFT TRACKING

TRACKING STUDIES  
 USE TRACKING (POSITION)  
 % TRACKS  
 1109 3006  
 SN (USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW)  
 UF TRAILS  
 RT CONVEYORS  
 GROUND TRACKS  
 METEOR TRAILS  
 MINITRACK SYSTEM  
 PARTICLE TRACKS  
 PARTICLE TRAJECTORIES  
 SMOKE TRAILS  
 TRACKING (POSITION)  
 VEHICULAR TRACKS

TRACTION  
 1503 2308  
 RT ADHESION  
 FRICTION  
 PULLING

TRACTORS  
 0205 1504  
 GS SURFACE VEHICLES  
 .MOTOR VEHICLES  
 .#TRACTORS  
 ...CRAWLER TRACTORS  
 ...TRACKED VEHICLES  
 RT AGRICULTURE  
 ELECTRIC MOTOR VEHICLES  
 GROUND HANDLING  
 HANDLING EQUIPMENT  
 LUNAR EXCAVATION EQUIPMENT  
 MATERIALS HANDLING  
 PLANTING  
 PLOWING  
 SLEDS

TOWING  
 TRANSPORTATION  
 TRUCKS  
 % VEHICLES

TRACTS  
 USE SITES

TRADEOFFS  
 3404 3406 4001  
 RT DECISION MAKING  
 MANAGEMENT ANALYSIS  
 MANAGEMENT PLANNING

TRADER AIRCRAFT  
 USE C-1A AIRCRAFT

TRADESCANTIA  
 0407 0409  
 GS PLANTS (BOTANY)  
 #TRADESCANTIA

TRADEX RADAR SYSTEM  
 0702 0705 0709  
 GS RADAR  
 #TRADEX RADAR SYSTEM  
 RT SEARCH RADAR  
 % SYSTEMS  
 TARGET RECOGNITION  
 TRACKING RADAR

TRAFFIC  
 0203 0506 2101  
 GS #TRAFFIC  
 .AIR TRAFFIC  
 RT ACCIDENTS  
 AVOIDANCE  
 HARBORS  
 TRANSPORTATION

TRAFFIC CONTROL  
 1101 1102 2101  
 GS #TRAFFIC CONTROL  
 .AIR TRAFFIC CONTROL  
 ...AUTOMATED EN ROUTE ATC  
 ..RADAR APPROACH CONTROL  
 RT AIR TRAFFIC CONTROLLERS (PERSONNEL)  
 AIRPORT TOWERS  
 APPROACH CONTROL  
 AVOIDANCE  
 COLLISION AVOIDANCE  
 % CONTROL  
 GROUND BASED CONTROL  
 NATIONAL AVIATION SYSTEM

# NASA THESAURUS HIERARCHICAL UPDATE

|                               |                                 |  |  |
|-------------------------------|---------------------------------|--|--|
| TRAGACANTH                    |                                 |  |  |
| O409                          |                                 |  |  |
| GS                            | PLANTS (BOTANY)                 |  |  |
| #                             | TRAGACANTH                      |  |  |
| TRAILBLAZER 1 REENTRY VEHICLE |                                 |  |  |
| 3105 3501                     |                                 |  |  |
| UF                            | TRAILBLAZER 1 ROCKET VEHICLE    |  |  |
| GS                            | REENTRY VEHICLES                |  |  |
| #                             | TRAILBLAZER 1 REENTRY VEHICLE   |  |  |
| RT                            | HONEST JOHN ROCKET VEHICLE      |  |  |
|                               | LANCE MISSILE                   |  |  |
|                               | MULTISTAGE ROCKET VEHICLES      |  |  |
|                               | NIKE-AJAX MISSILE               |  |  |
|                               | ROCKET VEHICLES                 |  |  |
|                               | SOLID PROPELLANT ROCKET ENGINES |  |  |
| TRAILBLAZER 1 ROCKET VEHICLE  |                                 |  |  |
| USE                           | TRAILBLAZER 1 REENTRY VEHICLE   |  |  |
| TRAILBLAZER 2 REENTRY VEHICLE |                                 |  |  |
| 3105 3501                     |                                 |  |  |
| UF                            | TRAILBLAZER 2 ROCKET VEHICLE    |  |  |
| GS                            | REENTRY VEHICLES                |  |  |
| #                             | TRAILBLAZER 2 REENTRY VEHICLE   |  |  |
| RT                            | MULTISTAGE ROCKET VEHICLES      |  |  |
|                               | ROCKET VEHICLES                 |  |  |
|                               | SOLID PROPELLANT ROCKET ENGINES |  |  |
|                               | TX-354 ENGINE                   |  |  |
| TRAILBLAZER 2 ROCKET VEHICLE  |                                 |  |  |
| USE                           | TRAILBLAZER 2 REENTRY VEHICLE   |  |  |
| TRAILERS                      |                                 |  |  |
| O802 1101 1103 1504           |                                 |  |  |
| RT                            | AUTOMOBILES                     |  |  |
|                               | COUPLINGS                       |  |  |
|                               | SLEDS                           |  |  |
|                               | TANK TRUCKS                     |  |  |
|                               | TOWED BODIES                    |  |  |
|                               | TOWING                          |  |  |
|                               | TRUCKS                          |  |  |
| TRAILING EDGE FLAPS           |                                 |  |  |
| O101 0102 0104 0201           |                                 |  |  |
| UF                            | VARIABLE AREA WINGS             |  |  |
| GS                            | AIRFOILS                        |  |  |
|                               | .FLAPS (CONTROL SURFACES)       |  |  |
|                               | ..WING FLAPS                    |  |  |
|                               | ..#TRAILING EDGE FLAPS          |  |  |
|                               | BRAKES (FOR ARRESTING MOTION)   |  |  |
|                               | .AERODYNAMIC BRAKES             |  |  |
|                               | ..WING FLAPS                    |  |  |
|                               | ..#TRAILING EDGE FLAPS          |  |  |
|                               | .AIRCRAFT BRAKES                |  |  |
| ..WING FLAPS                  |                                 |  |  |
| ..#TRAILING EDGE FLAPS        |                                 |  |  |
| CONTROL SURFACES              |                                 |  |  |
| .FLAPS (CONTROL SURFACES)     |                                 |  |  |
| ..WING FLAPS                  |                                 |  |  |
| ..#TRAILING EDGE FLAPS        |                                 |  |  |
| DRAG DEVICES                  |                                 |  |  |
| .AERODYNAMIC BRAKES           |                                 |  |  |
| ..WING FLAPS                  |                                 |  |  |
| ..#TRAILING EDGE FLAPS        |                                 |  |  |
| JET FLAPS                     |                                 |  |  |
| LEADING EDGE SLATS            |                                 |  |  |
| SPLIT FLAPS                   |                                 |  |  |
| VORTEX FLAPS                  |                                 |  |  |
| RT                            |                                 |  |  |
| TRAILING EDGES                |                                 |  |  |
| O101 0102 0104 0201           |                                 |  |  |
| GS                            | EDGES                           |  |  |
| #                             | TRAILING EDGES                  |  |  |
| ..                            | BLUNT TRAILING EDGES            |  |  |
| RT                            | AIRFOILS                        |  |  |
|                               | BLUNT LEADING EDGES             |  |  |
|                               | LEADING EDGES                   |  |  |
|                               | SHARP LEADING EDGES             |  |  |
|                               | VORTEX FLAPS                    |  |  |
| TRAILS                        |                                 |  |  |
| USE                           | TRACKS                          |  |  |
| TRAINEES                      |                                 |  |  |
| USE                           | STUDENTS                        |  |  |
| TRAINERS                      |                                 |  |  |
| USE                           | TRAINING DEVICES                |  |  |
| TRAINING                      |                                 |  |  |
| USE                           | EDUCATION                       |  |  |
| TRAINING AIRCRAFT             |                                 |  |  |
| O201 0502                     |                                 |  |  |
| GS                            | #TRAINING AIRCRAFT              |  |  |
|                               | .ALPHA JET AIRCRAFT             |  |  |
|                               | .CL-41 AIRCRAFT                 |  |  |
|                               | .DH 115 AIRCRAFT                |  |  |
|                               | .G-91 AIRCRAFT                  |  |  |
|                               | .JAGUAR AIRCRAFT                |  |  |
|                               | .JET PROVOST AIRCRAFT           |  |  |
|                               | .L-29 JET TRAINER               |  |  |
|                               | .T-2 AIRCRAFT                   |  |  |
|                               | .T-28 AIRCRAFT                  |  |  |
|                               | .T-33 AIRCRAFT                  |  |  |
|                               | .T-37 AIRCRAFT                  |  |  |
|                               | .T-38 AIRCRAFT                  |  |  |
|                               | .T-39 AIRCRAFT                  |  |  |
|                               | .TS-11 AIRCRAFT                 |  |  |
| ..WING FLAPS                  |                                 |  |  |
| ..#TRAILING EDGE FLAPS        |                                 |  |  |
| CONTROL SURFACES              |                                 |  |  |
| .FLAPS (CONTROL SURFACES)     |                                 |  |  |
| ..WING FLAPS                  |                                 |  |  |
| ..#TRAILING EDGE FLAPS        |                                 |  |  |
| BRAKES (FOR ARRESTING MOTION) |                                 |  |  |
| .AERODYNAMIC BRAKES           |                                 |  |  |
| ..WING FLAPS                  |                                 |  |  |
| ..#TRAILING EDGE FLAPS        |                                 |  |  |
| .AIRCRAFT BRAKES              |                                 |  |  |
| RT % AIRCRAFT                 |                                 |  |  |
| BOMBER AIRCRAFT               |                                 |  |  |
| FIGHTER AIRCRAFT              |                                 |  |  |
| GENERAL AVIATION AIRCRAFT     |                                 |  |  |
| JET AIRCRAFT                  |                                 |  |  |
| LIGHT AIRCRAFT                |                                 |  |  |
| % MILITARY AIRCRAFT           |                                 |  |  |
| % SUBSONIC AIRCRAFT           |                                 |  |  |
| TRAINING ANALYSIS             |                                 |  |  |
| 3405                          |                                 |  |  |
| RT % ANALYZING                |                                 |  |  |
| % DEVELOPMENT                 |                                 |  |  |
| EDUCATION                     |                                 |  |  |
| HANDBOOKS                     |                                 |  |  |
| LEARNING                      |                                 |  |  |
| PERSONNEL DEVELOPMENT         |                                 |  |  |
| PLANNING                      |                                 |  |  |
| RETRAINING                    |                                 |  |  |
| TRAINING DEVICES              |                                 |  |  |
| O201 0202 0203 0502           |                                 |  |  |
| UF                            | TRAINERS                        |  |  |
| GS                            | #TRAINING DEVICES               |  |  |
|                               | .TEACHING MACHINES              |  |  |
| RT                            | ALTITUDE SIMULATION             |  |  |
|                               | AUDIO VISUAL EQUIPMENT          |  |  |
|                               | CHILD DEVICE                    |  |  |
|                               | COCKPIT SIMULATORS              |  |  |
|                               | % DEVICES                       |  |  |
|                               | EDUCATION                       |  |  |
|                               | EDUCATIONAL TELEVISION          |  |  |
|                               | FLIGHT SIMULATORS               |  |  |
|                               | MULTIMEDIA                      |  |  |
|                               | ONBOARD EQUIPMENT               |  |  |
|                               | SIMULATORS                      |  |  |
|                               | VISUAL AIDS                     |  |  |
| TRAINING EVALUATION           |                                 |  |  |
| 3406                          |                                 |  |  |
| GS                            | EVALUATION                      |  |  |
| RT                            | #TRAINING EVALUATION            |  |  |
|                               | CERTIFICATION                   |  |  |
|                               | EXAMINATION                     |  |  |
|                               | INSTRUCTORS                     |  |  |
|                               | KNOWLEDGE                       |  |  |
|                               | % LEARNING                      |  |  |
|                               | % PERFORMANCE                   |  |  |
|                               | REVIEWING                       |  |  |
|                               | SCHOOLS                         |  |  |
|                               | STUDENTS                        |  |  |
| TRAINING SIMULATORS           |                                 |  |  |
| O502                          |                                 |  |  |
| UF                            | SIMULATOR TRAINING              |  |  |

GS SIMULATORS  
   #TRAINING SIMULATORS  
   ..FLIGHT SIMULATORS  
   ...COCKPIT SIMULATORS  
   ..SPACECRAFT CABIN SIMULATORS  
 RT ASTRONAUT TRAINING  
   CENTRIFUGES  
   CONTROL SIMULATION  
   FLIGHT SIMULATION  
   FLIGHT TRAINING  
   LANDING SIMULATION  
   LUNAR ORBIT AND LANDING SIMULATORS  
   % MISSILE SIMULATORS  
   PILOT TRAINING  
   SPACE FLIGHT TRAINING  
   VIRTUAL REALITY  
  
 TRAJECTORIES  
   1901 1904 3006 3009  
 GS #TRAJECTORIES  
   ..ABORT TRAJECTORIES  
   ..ASCENT TRAJECTORIES  
   ..BALLISTIC TRAJECTORIES  
   ..DESCENT TRAJECTORIES  
   ..REENTRY TRAJECTORIES  
   ..HYPERBOLIC TRAJECTORIES  
   ..INTERORBITAL TRAJECTORIES  
   ..MIDCOURSE TRAJECTORIES  
   ..MISSILE TRAJECTORIES  
   ..MOLECULAR TRAJECTORIES  
   ..PARTICLE TRAJECTORIES  
   ..ELECTRON TRAJECTORIES  
   ..RENDEZVOUS TRAJECTORIES  
   ..ROUND TRIP TRAJECTORIES  
   ..CIRCUMLUNAR TRAJECTORIES  
   ..SPACECRAFT TRAJECTORIES  
   ..EARTH-VENUS TRAJECTORIES  
   ..INTERPLANETARY TRAJECTORIES  
   ...EARTH-MARS TRAJECTORIES  
   ...EARTH-MERCURY TRAJECTORIES  
   ...LUNAR TRAJECTORIES  
   ...CIRCUMLUNAR TRAJECTORIES  
   ...EARTH-MOON TRAJECTORIES  
   ...MOON-EARTH TRAJECTORIES  
   ..SPINNING UNGUIDED ROCKET TRAJECTORY  
   ..UNDERWATER TRAJECTORIES  
 RT APEXES  
   BALLISTICS  
   % CURVES  
   DOWNRANGE  
   EQUATIONS OF MOTION  
   % FLIGHT  
   FLIGHT MECHANICS  
   FLIGHT OPTIMIZATION  
  
   FLIGHT PATHS  
   FLIGHT TIME  
   GREAT CIRCLES  
   MISSILES  
   ORBITS  
   ORDNANCE  
   PARABOLIC FLIGHT  
   % PATHS  
   ROCKET FLIGHT  
   SPACE FLIGHT  
   TRANSFER ORBITS  
  
   TRAJECTORY ANALYSIS  
   1904 3006 3110 3009  
   RT % ANALYZING  
   ASTRODYNAMICS  
   BALLISTICS  
   CAPTURE EFFECT  
   CELESTIAL MECHANICS  
   EQUATIONS OF MOTION  
   GODDARD TRAJECTORY DETERMINATION SYSTEM  
   IMPACT PREDICTION  
   MATHEMATICAL MODELS  
   NUMERICAL ANALYSIS  
   ORBITAL MECHANICS  
   PREFLIGHT ANALYSIS  
   SYSTEMS ANALYSIS  
   TRAJECTORY PLANNING  
  
   TRAJECTORY PLANNING  
   1504 1904 3406  
   UF PATH PLANNING  
   GS PLANNING  
   #TRAJECTORY PLANNING  
   RT ROBOT DYNAMICS  
   ROBOTICS  
   TRAJECTORY ANALYSIS  
   TRAJECTORY CONTROL  
   TRAJECTORY OPTIMIZATION  
  
   TRANQUILIZERS  
   O403 O405 O408  
   GS DRUGS  
   #TRANQUILIZERS  
   RT CENTRAL NERVOUS SYSTEM DEPRESSANTS  
   HYPERTENSION  
   SEDATIVES  
  
   TRANSALL C-160 AIRCRAFT  
   USE C-160 AIRCRAFT  
  
   TRANSATMOSPHERIC VEHICLES  
   3104 O207  
   RT AEROSPACE PLANES  
   AEROSPACE VEHICLES  
   % AIRCRAFT  
   AIRCRAFT DESIGN  
   NATIONAL AEROSPACE PLANE PROGRAM  
   % SPACECRAFT  
   SPACECRAFT DESIGN  
   X-30 VEHICLE  
  
   TRANSCIEVERS  
   USE TRANSMITTER RECEIVERS  
  
   TRANSCENDENTAL FUNCTIONS



[illegible]

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...INTERPLANETARY TRANSFER ORBITS
.SPACECRAFT ORBITS
.#TRANSFER ORBITS
...INTERPLANETARY TRANSFER ORBITS
RT
AEROASSIST
AEROBRAKING
AEROCAPTURE
AEROMANEUVERING
CIRCUMLUNAR TRAJECTORIES
EARTH ORBITAL RENDEZVOUS
EARTH ORBITS
EARTH-MARS TRAJECTORIES
EARTH-MERCURY TRAJECTORIES
EARTH-MOON TRAJECTORIES
EARTH-VENUS TRAJECTORIES
INTERPLANETARY TRAJECTORIES
LUNAR ORBITS
LUNAR TRAJECTORIES
MOON-EARTH TRAJECTORIES
ORBIT INSERTION
ORBITAL LAUNCHING
ORBITAL MECHANICS
PARKING ORBITS
PLANETARY ORBITS
SATELLITE ORBITS
SOLAR ORBITS
SPACE RENDEZVOUS
SPACECRAFT DOCKING
TRAJECTORIES
TRANSEARTH INJECTION
TRANSFERRING
TRANSLUNAR INJECTION

3104
GS
PASSAGEWAYS
#TRANSFER TUNNELS
RT
ENTRANCES
% TUNNELS

TRANSFERRED ELECTRON DEVICES
0903
UF
TED
GS
ELECTRONIC EQUIPMENT
.SOLID STATE DEVICES
..SEMICONDUCTOR DEVICES
..#TRANSFERRED ELECTRON DEVICES
RT
DIFFRACTION RADIATION
ELECTRON TRANSFER
GALLIUM ARSENIDES
INDIUM PHOSPHIDES
MICROWAVE AMPLIFIERS
MICROWAVE OSCILLATORS

TRANSFERRING

3406 3407 3408
UF TRANSFER
GS #TRANSFERRING
.DROP TRANSFER
RT CHARGE TRANSFER
ELECTRON TRANSFER
ENERGY TRANSFER
EXCHANGING
HEAT TRANSFER
MASS TRANSFER
MATERIALS HANDLING
MOMENTUM TRANSFER
% SHIFT
TECHNOLOGY TRANSFER
TRANSFER ORBITS
TRANSPORTATION

TRANSFORM INTEGRALS
USE INTEGRAL TRANSFORMATIONS

TRANSFORMATION TENSORS
USE TENSORS

% TRANSFORMATIONS
0404 1704 1902 2311 3407
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT FUJITA METHOD
FUNCTIONS (MATHEMATICS)
ORDER-DISORDER TRANSFORMATIONS
PHASE TRANSFORMATIONS
TRANSFORMATIONS (MATHEMATICS)

TRANSFORMATIONS (MATHEMATICS)
1902 1903
UF TRANSFORMS
GS #TRANSFORMATIONS (MATHEMATICS)
.COORDINATE TRANSFORMATIONS
.HOUSEHOLDER TRANSFORMATIONS
.INTEGRAL TRANSFORMATIONS
..FOURIER TRANSFORMATION
...FAST FOURIER TRANSFORMATIONS
..FOURIER-BESSEL TRANSFORMATIONS
..HILBERT TRANSFORMATION
..LAPLACE TRANSFORMATION
.LINEAR TRANSFORMATIONS
FUJITA METHOD
RT FUNCTIONS (MATHEMATICS)
GAUGE INVARIANCE
RACAQ COEFFICIENT
% TRANSFORMATIONS
WAVELET ANALYSIS

TRANSFORMERS

0302 0904
GS #TRANSFORMERS
.INSTRUMENT TRANSFORMERS
.MODE TRANSFORMERS
.VOLTAGE CONVERTERS (AC TO AC)
RT AMPLIFIERS
BALLASTS (IMPEDANCES)
CIRCUIT PROTECTION
% CONVERTERS
COUPLING CIRCUITS
DIPLEXERS
ELECTRIC COILS
ELECTRIC FILTERS
ELECTRIC MOTORS
ELECTRIC REACTORS
ELECTRICAL GROUNDING
INDUCTANCE
MAGNET COILS
MAGNETIC CIRCUITS
MAGNETIC CORES
OSCILLATORS
PHASE CONTROL
PLASMA CONTROL
POWER SUPPLY CIRCUITS
RESOLVERS
SATURABLE REACTORS
SOLID STATE DEVICES
TOROIDS
UP-CONVERTERS
VOLTAGE REGULATORS

TRANSFORMS
USE TRANSFORMATIONS (MATHEMATICS)

TRANSFUSION
0401 0405
RT BLOOD
FIRST AID
MEDICAL SCIENCE
SYRINGES
VEINS

TRANSGRANULAR CORROSION
1702
GS CHEMICAL ATTACK
#TRANSGRANULAR CORROSION
CORROSION
#TRANSGRANULAR CORROSION
CORROSION TESTS
GRAIN BOUNDARIES
INTERGRANULAR CORROSION
METAL FATIGUE
PROTECTIVE COATINGS
STRESS CORROSION

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[illegible]

|    |                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | OCCULTATION<br>TRANSIT SATELLITES<br>TRANSITS                                                                                                                                                                                     |  | RT                                                                                                                                                                                                                                                                                                                                                              | AIRCRAFT MANEUVERS<br>% FLIGHT<br>HORIZONTAL FLIGHT<br>HOVERING<br>V/STOL AIRCRAFT<br>VERTICAL FLIGHT                                                                                                                  | ...IRON<br>...IRON ISOTOPES<br>...IRON 57<br>...IRON 58<br>...IRON 59<br>...MANGANESE<br>...MANGANESE ISOTOPES<br>...MERCURY (METAL)<br>...MOLYBDENUM<br>...NICKEL<br>...NICKEL ISOTOPES<br>...NIOBium<br>...NIObIUM ISOTOPES<br>...NIObIUM 95<br>...OSMIUM<br>...OSMIUM ISOTOPES<br>...PALLADIUM<br>...PLATINUM<br>...PLATINUM ISOTOPES<br>...RHENIUM<br>...RHENIUM ISOTOPES<br>...RHODIUM<br>...RHODIUM ISOTOPES<br>...RUTHENIUM<br>...RUTHENIUM ISOTOPES<br>...SCANDIUM<br>...SCANDIUM ISOTOPES<br>...SILVER<br>...SILVER ISOTOPES<br>...TANTALUM<br>...TANTALUM ISOTOPES<br>...TECHNETIUM<br>...TECHNETIUM ISOTOPES<br>...TI TAN IUM<br>...TI TAN IUM ISOTOPES<br>...TUNGSTEN<br>...TUNGSTEN ISOTOPES<br>...VANADIUM<br>...VANADIUM ISOTOPES<br>...YTTRIUM<br>...YTTRIUM ISOTOPES<br>...ZINC<br>...ZINC ISOTOPES<br>...ZIRCONIUM<br>...ZIRCONIUM ISOTOPES |
|    | TRANSIT ATTITUDE CONTROL SATELLITE<br>2103 2104 3107<br>UF TRAAC SATELLITE<br>GS ARTIFICIAL SATELLITES<br>.NAVIGATION SATELLITES<br>.#TRANSIT ATTITUDE CONTROL<br>SATELLITE<br>RT % CONTROL<br>SATELLITE ATTITUDE CONTROL         |  |                                                                                                                                                                                                                                                                                                                                                                 | TRANSITION FLOW<br>O201 1202 1203<br>GS FLUID FLOW<br>.GAS FLOW<br>..MOLECULAR FLOW<br>..#TRANSITION FLOW<br>BOUNDARY LAYER TRANSITION<br>FREE MOLECULAR FLOW<br>PERIOD DOUBLING<br>RAREFIED GAS DYNAMICS<br>SLIP FLOW | ACTINIDE SERIES<br>COMPLEX COMPOUNDS<br>METAL NITRIDES<br>PALLADIUM COMPOUNDS<br>RARE EARTH ELEMENTS<br>REFRACTORY METALS<br>RUTHENIUM COMPOUNDS<br>SHAPE MEMORY ALLOYS<br>TRANSURANIUM ELEMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | TRANSIT NAVIGATION SYSTEM<br>2104 GS SATELLITE NAVIGATION SYSTEMS<br>#TRANSIT NAVIGATION SYSTEM<br>RT NASA PROGRAMS<br>NAVIGATION SATELLITES<br>NOVA SATELLITES<br>TRANSIT SATELLITES                                             |  | % TRANSITION LAYERS<br>O101 1202 1203<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                                                                  |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|    | TRANSIT SATELLITES<br>2103 2104 3107 3409<br>GS ARTIFICIAL SATELLITES<br>.NAVIGATION SATELLITES<br>.#TRANSIT SATELLITES<br>DISCOS (SATELLITE ATTITUDE CONTROL)<br>RT % TRANSIT<br>TRANSIT NAVIGATION SYSTEM                       |  | RT BOUNDARY LAYER TRANSITION<br>INTERLAYERS<br>LAMINAR FLOW<br>PLASMA LAYERS<br>SHEAR LAYERS<br>SHOCK LAYERS<br>SHOCK WAVES<br>SURFACE LAYERS<br>TURBULENT FLOW                                                                                                                                                                                                 |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|    | TRANSIT TIME<br>1901 3001 3003<br>SN (NOT LIMITED TO ASTRONOMICAL TIMES<br>OF TRANSIT)<br>GS TIME<br>#TRANSIT TIME<br>RT BARRITT DIODES<br>CAT DEVICES<br>FLIGHT TIME<br>% MOTION                                                 |  | TRANSITION METALS<br>O603 1703<br>GS METALS<br>#TRANSITION METALS<br>..CADMIUM<br>..CADIUM ISOTOPES<br>..CHROMIUM<br>..CHROMIUM ISOTOPES<br>..COBALT<br>..COBALT ISOTOPES<br>...COBALT 58<br>...COBALT 60<br>..COPPER<br>..COPPER ISOTOPES<br>..GOLD<br>...GOLD ISOTOPES<br>...GOLD 198<br>..HAFNIUM<br>...HAFNIUM ISOTOPES<br>..IRIDIUM<br>...IRIDIUM ISOTOPES |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|    | % TRANSITION<br>1704 2311 3407<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)<br>RT BOUNDARY LAYER TRANSITION<br>ELECTRON TRANSITIONS<br>FORBIDDEN TRANSITIONS<br>PHASE TRANSFORMATIONS |  |                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                        | RT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|    | TRANSITION FLIGHT<br>O201                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

# NASA THESAURUS HIERARCHICAL UPDATE

TRANSITION POINTS  
 O101 1202 1203  
 RT BOUNDARY LAYER TRANSITION  
 % EQUILIBRIUM  
 KNUDSEN FLOW  
 PHASE DIAGRAMS  
 REYNOLDS NUMBER

TRANSITION PRESSURE  
 1202  
 GS PRESSURE  
 #TRANSITION PRESSURE  
 RT HIGH PRESSURE  
 HYDROSTATIC PRESSURE  
 PHASE TRANSFORMATIONS  
 PRESSURE EFFECTS

TRANSITION PROBABILITIES  
 1902 1905 2309 2403  
 RT ELECTRON TRANSITIONS  
 EXCITATION  
 FERMI SURFACES  
 NUCLEAR CAPTURE  
 PROBABILITY THEORY  
 SPECTRA

TRANSITION TEMPERATURE  
 2302 2303 2304 2603 3304  
 GS TEMPERATURE  
 #TRANSITION TEMPERATURE  
 RT DUCTILE-BRITTLE TRANSITION  
 GLASS TRANSITION TEMPERATURE  
 HEAT OF FUSION  
 KONDO EFFECT  
 LIQUID PHASES  
 MELTING POINTS  
 PHASE DIAGRAMS  
 PHASE TRANSFORMATIONS  
 SOLIDIFICATION  
 SUPERCONDUCTING POWER TRANSMISSION  
 SUPERCONDUCTIVITY

TRANSITS  
 1402  
 SN (EXCLUDES PARTIAL OR TOTAL  
 OCCULTATION OF ONE BODY BY ANOTHER)  
 GS MEASURING INSTRUMENTS  
 .OPTICAL MEASURING INSTRUMENTS  
 .#TRANSITS  
 ...THEODOLITES  
 ....CINETHEODOLITES  
 OPTICAL EQUIPMENT  
 .OPTICAL MEASURING INSTRUMENTS  
 .#TRANSITS

...THEODOLITES  
 ....CINETHEODOLITES  
 RT COMPASSES  
 SEXTANTS  
 % TRANSIT

TRANSLATING  
 O702 0802 2308 3405 3407  
 GS #TRANSLATING  
 .MACHINE TRANSLATION  
 RT DECODING  
 DOCUMENTATION  
 % INTERPRETATION  
 LANGUAGES  
 TECHNICAL WRITING  
 % TRANSLATORS

TRANSLATIONAL MOTION  
 1901 1904 3001 3006 3009  
 GS #TRANSLATIONAL MOTION  
 .THREE DIMENSIONAL MOTION  
 ..THREE DIMENSIONAL FLOW  
 ...KARMAN-BODEWADT FLOW  
 ...SECONDARY FLOW  
 RT % MOTION  
 RACKS (GEARS)  
 RIGID STRUCTURES

% TRANSLATORS  
 O802 1902  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT COMPUTER PROGRAMS  
 DECODERS  
 DIGITAL TO VOICE TRANSLATORS  
 LANGUAGE PROGRAMMING  
 REPEATERS  
 TRANSLATING

TRANSLUCENCE  
 O710 2306 2310 3408  
 GS ELECTROMAGNETIC PROPERTIES  
 .OPTICAL PROPERTIES  
 .#TRANSLUCENCE  
 RT LIGHT TRANSMISSION  
 OPACITY  
 OPTICAL DENSITY  
 TRANSMISSIVITY  
 TRANSPARENCE

TRANSLUNAR INJECTION  
 2102  
 GS INJECTION  
 #TRANSLUNAR INJECTION

RT INJECTION GUIDANCE  
 MIDCOURSE GUIDANCE  
 ORBITAL MECHANICS  
 TRANSFER ORBITS

TRANSLUNAR SPACE  
 USE INTERPLANETARY SPACE

TRANSMISSION  
 O702 1504 2311 3407  
 UF COAXIAL TRANSMISSION  
 GS #TRANSMISSION  
 .DEMULPLEXING  
 .ELECTRIC POWER TRANSMISSION  
 .ELECTROMAGNETIC WAVE TRANSMISSION  
 ..LIGHT TRANSMISSION  
 ...LIGHT SCATTERING  
 ....HALOS  
 ...RADAR TRANSMISSION  
 ...RADIO TRANSMISSION  
 ...DOUBLE SIDEBAND TRANSMISSION  
 ...IONOSPHERIC PROPAGATION  
 ....IONOSPHERIC F-SCATTER  
 ...PROPAGATION  
 ...MICROWAVE ATTENUATION  
 ...MICROWAVE TRANSMISSION  
 ...MULTIPATH TRANSMISSION  
 ...SHORT WAVE RADIO TRANSMISSION  
 ...SINGLE SIDEBAND TRANSMISSION  
 ...SPREAD SPECTRUM TRANSMISSION  
 ...TRANSEQUALATORIAL PROPAGATION  
 ...TRANSHORIZON RADIO PROPAGATION  
 ...SCATTER PROPAGATION  
 ...IONOSPHERIC F-SCATTER  
 ...PROPAGATION

..TELEVISION TRANSMISSION  
 .HEAT TRANSMISSION  
 ..HEAT TRANSFER  
 ...AERODYNAMIC HEAT TRANSFER  
 ...HYPERSONIC HEAT TRANSFER  
 ...SUPERSONIC HEAT TRANSFER  
 ...CONDUCTIVE HEAT TRANSFER  
 ...CONVECTIVE HEAT TRANSFER  
 ...LAMINAR HEAT TRANSFER  
 ...RADIATIVE HEAT TRANSFER  
 ...TURBULENT HEAT TRANSFER  
 .MULTIPLEXING  
 ..CODE DIVISION MULTIPLEXING  
 ..FREQUENCY DIVISION MULTIPLEXING  
 ..TIME DIVISION MULTIPLEXING  
 ..WAVELENGTH DIVISION MULTIPLEXING  
 .SELF PROPAGATION  
 .SIGNAL TRANSMISSION  
 ..DATA TRANSMISSION  
 ...AUTOMATIC PICTURE TRANSMISSION

...MULTIPLE ACCESS  
 ...ALOHA SYSTEM  
 ...CODE DIVISION MULTIPLE ACCESS  
 ...FREQUENCY DIVISION MULTIPLE ACCESS  
 ...PACKET TRANSMISSION  
 ...ALOHA SYSTEM  
 ...SINGLE CHANNEL PER CARRIER TRANSMISSION  
 ...RADAR TRANSMISSION  
 ...RADIO TRANSMISSION  
 ...DOUBLE SIDEBAND TRANSMISSION  
 ...IONOSPHERIC PROPAGATION  
 ...IONOSPHERIC F-SCATTER PROPAGATION  
 ...MICROWAVE ATTENUATION  
 ...MULTIPATH TRANSMISSION  
 ...SHORT WAVE RADIO TRANSMISSION  
 ...SINGLE SIDEBAND TRANSMISSION  
 ...TRANSEQUATORIAL PROPAGATION  
 ...TRANSHORIZON RADIO PROPAGATION  
 ...SATELLITE TRANSMISSION  
 ...TELEMETRY  
 ...BIOTELEMETRY  
 ...P.A.C.M. TELEMETRY  
 ...PCM TELEMETRY  
 ...RADIO TELEMETRY  
 ...PULSE FREQUENCY MODULATION TELEMETRY  
 ...TELEVISION TRANSMISSION  
 ...SOUND TRANSMISSION  
 ...STRESS PROPAGATION  
 ...TELEPHONY  
 ...WAVE PROPAGATION  
 ...ACOUSTIC PROPAGATION  
 ...DIFFRACTION PROPAGATION  
 ...GROUND WAVE PROPAGATION  
 ...IONOSPHERIC PROPAGATION  
 ...IONOSPHERIC F-SCATTER PROPAGATION  
 ...LIGHT SCATTERING  
 ...HALOS  
 ...SCATTER PROPAGATION  
 ...IONOSPHERIC F-SCATTER PROPAGATION  
 ...SHOCK WAVE PROPAGATION  
 ...TRANSEQUATORIAL PROPAGATION  
 ABSORPTANCE  
 ATMOSPHERIC ATTENUATION  
 ATTENUATION  
 BROADCASTING  
 % CONDUCTION  
 DIFFRACTION  
 ELECTROMAGNETIC ABSORPTION

ELECTROMAGNETIC RADIATION  
 OPTICAL FILTERS  
 OUTPUT  
 % PROPAGATION  
 RADAR ATTENUATION  
 RADIO ATTENUATION  
 REFLECTION  
 REFRACTION  
 SIGNAL REFLECTION  
 TELECOMMUNICATION  
 TRANSMISSIVITY  
 TRANSMITTANCE  
 WAVE DISPERSION  
 TRANSMISSION CIRCUITS  
 0702 0904 0905  
 GS CIRCUITS  
 #TRANSMISSION CIRCUITS  
 RT CIRCUIT PROTECTION  
 ELECTRIC POWER TRANSMISSION  
 SIGNAL STABILIZATION  
 STRIP TRANSMISSION LINES  
 TELECOMMUNICATION  
 TRANSMISSION EFFICIENCY  
 0702 0710 2402  
 GS EFFICIENCY  
 #TRANSMISSION EFFICIENCY  
 RT ALOHA SYSTEM  
 ATTENUATION COEFFICIENTS  
 BIT ERROR RATE  
 CARRIER TO NOISE RATIOS  
 DATA TRANSMISSION  
 DOWNLINKING  
 ELECTROMAGNETIC WAVE TRANSMISSION  
 FREQUENCY HOPPING  
 INTERSYMBOLIC INTERFERENCE  
 NETWORK CONTROL  
 OPACITY  
 PACKET TRANSMISSION  
 PACKETS (COMMUNICATION)  
 POWER EFFICIENCY  
 SIGNAL TRANSMISSION  
 TRANSMISSION RATE (COMMUNICATIONS)  
 TRANSMITTANCE  
 UPLINKING  
 TRANSMISSION ELECTRON MICROSCOPY  
 1406  
 UF TEM (MICROSCOPY)  
 GS MICROSCOPY  
 .ELECTRON MICROSCOPY  
 .#TRANSMISSION ELECTRON MICROSCOPY  
 RT ELECTRON BEAMS  
 ELECTRON SCATTERING

FIELD EMISSION  
 ION MICROSCOPES  
 MAGNETIC LENSES  
 MICROANALYSIS  
 PHASE CONTRAST  
 SCANNING TUNNELING MICROSCOPY  
 TRANSMISSION FLUIDS  
 1503 1504  
 RT FLUID TRANSMISSION LINES  
 % FLUIDS  
 HYDRAULIC FLUIDS  
 WORKING FLUIDS  
 TRANSMISSION LINES  
 0702 0710 2402  
 UF TRUNKS (LINES)  
 GS #TRANSMISSION LINES  
 .COMMUNICATION CABLES  
 .COAXIAL CABLES  
 .FLUID TRANSMISSION LINES  
 .POWER LINES  
 .STRIP TRANSMISSION LINES  
 .MICROSTRIP TRANSMISSION LINES  
 .SUBMARINE CABLES  
 .UNDERGROUND TRANSMISSION LINES  
 .ACOUSTIC DELAY LINES  
 ANTENNA COUPLERS  
 ANTENNA FEEDS  
 BACKWARD WAVES  
 CABLES  
 CIRCUIT PROTECTION  
 CIRCUITS  
 DELTA ANTENNAS  
 DIRECTIONAL COUPLERS  
 DISTRIBUTED AMPLIFIERS  
 ELECTRIC CONDUCTORS  
 ELECTRIC CURRENT  
 ELECTRIC POWER TRANSMISSION  
 ELECTRIC WIRE  
 ELECTRICAL ENGINEERING  
 ELECTRIFICATION  
 HARNESSSES  
 IMPEDANCE MATCHING  
 INSULATORS  
 % LINES  
 MODE TRANSFORMERS  
 % NETWORKS  
 NONRESONANCE  
 OPTICAL FIBERS  
 SMITH CHART  
 STANDING WAVE RATIOS  
 SUPERCONDUCTING POWER TRANSMISSION  
 TELECOMMUNICATION  
 WAVEGUIDES

RT

# NASA THESAURUS HIERARCHICAL UPDATE

## WIRING

TRANSMISSION LOSS  
 0702 0703 0710 2402  
 RT ATTENUATION  
 CURRENT REGULATORS  
 ELECTRIC POWER TRANSMISSION  
 INSERTION  
 INSERTION LOSS  
 LOSSES  
 LOSSY MEDIA  
 SILENCE  
 TRANSMISSION RATE (COMMUNICATIONS)  
 VOLTAGE REGULATORS  
 WAVE DISPERSION

TRANSMISSION RATE (COMMUNICATIONS)  
 UF TRANSMISSION SPEED (COMMUNICATIONS)  
 GS RATES (PER TIME)  
 #TRANSMISSION RATE (COMMUNICATIONS)  
 RT ACCESS TIME  
 BIT ERROR RATE  
 CHANNEL CAPACITY  
 DATA TRANSMISSION  
 DELAY  
 INTERPROCESSOR COMMUNICATION  
 SATELLITE COMMUNICATION  
 SIGNAL RECEPTION  
 SIGNAL TRANSMISSION  
 TELECOMMUNICATION  
 TIME LAG  
 TRANSMISSION EFFICIENCY  
 TRANSMISSION LOSS

TRANSMISSION SPEED (COMMUNICATIONS)  
 USE TRANSMISSION RATE (COMMUNICATIONS)

TRANSMISSIONS (MACHINE ELEMENTS)  
 1402  
 GS MECHANICAL DRIVES  
 #TRANSMISSIONS (MACHINE ELEMENTS)  
 RT GEARS  
 SHAFTS (MACHINE ELEMENTS)  
 TORQUE CONVERTERS  
 TORQUE MOTORS  
 VEHICLE WHEELS

TRANSMISSIONS  
 0710 2306 2310 2402  
 GS ELECTROMAGNETIC PROPERTIES  
 .OPTICAL PROPERTIES  
 .#TRANSMISSIVITY  
 ABSORPTANCE  
 ABSORPTIVITY  
 DENSITY (MASS/VOLUME)

LIGHT SCATTERING  
 OPACITY  
 % PHYSICAL PROPERTIES  
 TRANSLUCENCE  
 TRANSMISSION  
 TRANSMITTANCE  
 TRANSPARENCE  
 TRANSPONDERS  
 VISIBILITY

TRANSMISSOMETERS  
 0905 1406 2402  
 GS MEASURING INSTRUMENTS  
 .OPTICAL MEASURING INSTRUMENTS  
 .#TRANSMISSOMETERS  
 OPTICAL EQUIPMENT  
 .OPTICAL MEASURING INSTRUMENTS  
 .#TRANSMISSOMETERS  
 PHOTOMETERS  
 RADIANCE  
 TELEPHOTOMETRY  
 TRANSMITTANCE

TRANSMITTANCE  
 0710 2306 2402  
 GS ELECTROMAGNETIC PROPERTIES  
 .OPTICAL PROPERTIES  
 .#TRANSMITTANCE  
 ABSORPTANCE  
 ATTENUATION COEFFICIENTS  
 DENSITY (MASS/VOLUME)  
 ELECTROMAGNETIC ABSORPTION  
 INFRARED ABSORPTION  
 LIGHT (VISIBLE RADIATION)  
 OPTICAL DENSITY  
 PHOTOMETRY  
 RAY TRACING  
 REFLECTANCE  
 SCATTERING  
 TRANSMISSION  
 TRANSMISSION EFFICIENCY  
 TRANSMISSIVITY  
 TRANSMISSOMETERS  
 TRANSPARENCE

TRANSMITTER RECEIVERS  
 0701 0705 0905  
 UF TRANSCIEVERS  
 GS COMMUNICATION EQUIPMENT  
 .RADIO RECEIVERS  
 .#TRANSMITTER RECEIVERS  
 RADIO EQUIPMENT  
 .RADIO RECEIVERS  
 .#TRANSMITTER RECEIVERS

.RADIO TRANSMITTERS  
 .#TRANSMITTER RECEIVERS  
 RECEIVERS  
 .RADIO RECEIVERS  
 .#TRANSMITTER RECEIVERS  
 TRANSMITTERS  
 .RADIO TRANSMITTERS  
 .#TRANSMITTER RECEIVERS  
 INTERROGATION  
 TRANSPONDERS

RT

TRANSMITTERS  
 0701 0904  
 UF SENDERS  
 GS #TRANSMITTERS  
 .EMERGENCY LOCATOR TRANSMITTERS  
 .INSTRUMENT TRANSMITTERS  
 .RADAR TRANSMITTERS  
 .RADIO TRANSMITTERS  
 .RADIO BEACONS  
 ...OMNIDIRECTIONAL RADIO RANGES  
 ...SELF CALIBRATING OMNIRANGE  
 ...RADIOMETEORGRAPHS  
 ...RADIOSONDES  
 ...ENDORADIOSONDES  
 ...IONOSONDES  
 ...RAWINSONDES  
 ...RADIOTELEPHONES  
 ...SONOBUOYS  
 .TRANSMITTER RECEIVERS  
 .REPEATERS  
 ANTENNAS  
 ATTENUATION  
 DUPLEXERS  
 % INSTRUMENTS  
 MICROPHONES  
 RECEIVERS  
 SIGNAL ENCODING  
 TELECOMMUNICATION  
 TELEVISION TRANSMISSION  
 TRANSPONDERS

RT

TRANSMUTATION  
 0603  
 GS NUCLEAR REACTIONS  
 .NUCLEAR TRANSFORMATIONS  
 .#TRANSMUTATION  
 NEUTRON IRRADIATION  
 RADIOGENIC MATERIALS

RT

TRANSCOCEANIC COMMUNICATION  
 0702 3404  
 GS TELECOMMUNICATION  
 #TRANSCOCEANIC COMMUNICATION  
 TRANSCOCEANIC SYSTEMS

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

HEART IMPLANTATION  
SURGERY

TRANSPONDER CONTROL GROUP  
0702 0802 0905 1003  
UF TCG (TRACKING)  
RT % CONTROL  
RADAR TRACKING  
SATELLITE TRACKING  
SPACECRAFT TRACKING  
TELEMETRY  
TRANSPONDERS

TRANSPONDERS  
0701 0702 0710 0905  
UF RESPONDERS  
GS RADIO EQUIPMENT  
#TRANSPONDERS  
RT AIR TRAFFIC CONTROL  
BEACON COLLISION AVOIDANCE SYSTEM  
INTERROGATION  
RADAR BEACONS  
RADAR EQUIPMENT  
RADIO RECEIVERS  
RADIO TRANSMITTERS  
TRANSMISSIVITY  
TRANSMITTER RECEIVERS  
TRANSMITTERS  
TRANSPONDER CONTROL GROUP

TRANSPORT AIRCRAFT  
0201 0204 0207  
GS #TRANSPORT AIRCRAFT  
.ALADIN 2 AIRCRAFT  
.AN-2 AIRCRAFT  
.AN-22 AIRCRAFT  
.AN-24 AIRCRAFT  
.ARGOSY MK-1 AIRCRAFT  
.BAC 111 AIRCRAFT  
.BOEING 707 AIRCRAFT  
.BOEING 720 AIRCRAFT  
.BOEING 727 AIRCRAFT  
.BOEING 733 AIRCRAFT  
.BOEING 737 AIRCRAFT  
.BOEING 747 AIRCRAFT  
.BOEING 757 AIRCRAFT  
.BOEING 767 AIRCRAFT  
.BOEING 2707 AIRCRAFT  
.CARGO AIRCRAFT  
.BREGUET 941 AIRCRAFT  
.C-1A AIRCRAFT  
.C-2 AIRCRAFT  
.C-5 AIRCRAFT  
.C-9 AIRCRAFT  
.C-46 AIRCRAFT

.C-47 AIRCRAFT  
.C-54 AIRCRAFT  
.C-118 AIRCRAFT  
.C-119 AIRCRAFT  
.C-121 AIRCRAFT  
.C-123 AIRCRAFT  
.C-124 AIRCRAFT  
.C-130 AIRCRAFT  
.C-131 AIRCRAFT  
.C-133 AIRCRAFT  
.C-135 AIRCRAFT  
.C-140 AIRCRAFT  
.C-141 AIRCRAFT  
.C-160 AIRCRAFT  
.CL-44 AIRCRAFT  
.DC 3 AIRCRAFT  
.DC 7 AIRCRAFT  
.F-27 AIRCRAFT  
.P-160 AIRCRAFT  
.P-166 AIRCRAFT  
.SPANLOADER AIRCRAFT  
.YC-14 AIRCRAFT  
.CH-3 HELICOPTER  
.CH-34 HELICOPTER  
.CH-46 HELICOPTER  
.CH-47 HELICOPTER  
.CH-54 HELICOPTER  
.CL-84 AIRCRAFT  
.CL-823 AIRCRAFT  
.CONCORDE AIRCRAFT  
.CV-880 AIRCRAFT  
.DC 8 AIRCRAFT  
.DC 9 AIRCRAFT  
.DC 10 AIRCRAFT  
.DH 121 AIRCRAFT  
.DH 125 AIRCRAFT  
.DHC 2 AIRCRAFT  
.DHC 4 AIRCRAFT  
.DHC 5 AIRCRAFT  
.DO-31 AIRCRAFT  
.EC-121 AIRCRAFT  
.ELECTRA AIRCRAFT  
.F-28 TRANSPORT AIRCRAFT  
.G-1 AIRCRAFT  
.G-222 AIRCRAFT  
.H-19 HELICOPTER  
.H-53 HELICOPTER  
.H-56 HELICOPTER  
.HC-3 HELICOPTER  
.HFB-320 AIRCRAFT  
.IL-14 AIRCRAFT  
.L-1011 AIRCRAFT  
.L-2000 AIRCRAFT  
.LIGHT INTRATHEATER TRANSPORT  
.LIGHT TRANSPORT AIRCRAFT

.LOCKHEED MODEL 18 AIRCRAFT  
.MH-262 AIRCRAFT  
.MYSTERE 20 AIRCRAFT  
.S-58 HELICOPTER  
.S-61 HELICOPTER  
.SA-330 HELICOPTER  
.SC-5 AIRCRAFT  
.SC-7 AIRCRAFT  
.SH-3 HELICOPTER  
.SH-4 HELICOPTER  
.SHORT HAUL AIRCRAFT  
.C-8A AUGMENTOR WING AIRCRAFT  
.CESSNA 402B AIRCRAFT  
.EUROPEAN AIRBUS  
.A-300 AIRCRAFT  
.A-310 AIRCRAFT  
.A-320 AIRCRAFT  
.MERCURE AIRCRAFT  
.TANKER AIRCRAFT  
.TU-124 AIRCRAFT  
.TU-144 AIRCRAFT  
.TU-154 AIRCRAFT  
.UH-34 HELICOPTER  
.UH-60A HELICOPTER  
.UH-61A HELICOPTER  
.VC-10 AIRCRAFT  
.VISCOUNT AIRCRAFT  
.XC-142 AIRCRAFT  
.YS-11 AIRCRAFT  
RT AIR TRANSPORTATION  
% AIRCRAFT  
COMMERCIAL AIRCRAFT  
GENERAL AVIATION AIRCRAFT  
JET AIRCRAFT  
LIGHT AIRCRAFT  
% LOW WING AIRCRAFT  
% MILITARY AIRCRAFT  
MYSTERE 50 AIRCRAFT  
PASSENGER AIRCRAFT  
ROTARY WING AIRCRAFT  
% SUBSONIC AIRCRAFT  
% SUPERSONIC AIRCRAFT  
% TRANSPORT VEHICLES  
TURBOFAN AIRCRAFT  
TURBOPROP AIRCRAFT  
UTILITY AIRCRAFT  
V/STOL AIRCRAFT  
WATER TAKEOFF AND LANDING AIRCRAFT

TRANSPORT COEFFICIENTS  
USE TRANSPORT PROPERTIES

TRANSPORT PROPERTIES  
0603 1203 2403 3304 3408 3501  
UF TRANSPORT COEFFICIENTS

```

GS #TRANSPORT PROPERTIES
..ATMOSPHERIC CONDUCTIVITY
..IONOSPHERIC CONDUCTIVITY
..CARRIER MOBILITY
..ELECTRON MOBILITY
..HOLE MOBILITY
..DIFFUSION COEFFICIENT
..SORET COEFFICIENT
..ELECTRICAL RESISTIVITY
..IONOSPHERIC CONDUCTIVITY
..MAGNETORESISTIVITY
..PHOTOCONDUCTIVITY
..PLASMA CONDUCTIVITY
..SUPERCONDUCTIVITY
..KONDO EFFECT
..GASEOUS DIFFUSION
..GASEOUS SELF-DIFFUSION
..IONIC MOBILITY
..THERMAL CONDUCTIVITY
..THERMAL DIFFUSIVITY
..VISCOSITY
..EDDY VISCOSITY
..GAS VISCOSITY
RT BINARY FLUIDS
BOLTZMANN TRANSPORT EQUATION
% CONDUCTIVITY
DIFFUSION
FLOW COEFFICIENTS
HALL EFFECT
HEAT TRANSFER
HIGH TEMPERATURE TESTS
KINETIC THEORY
LIGHTHILL GAS MODEL
MOBILITY
% PHYSICAL PROPERTIES
POLLUTION TRANSPORT
% PROPERTIES
RADIATION TRANSPORT
SEEBECK EFFECT
% SOLID STATE PHYSICS
THERMOELECTRICITY

TRANSPORT THEORY
O603 1203 2403 3304 3501
GS KINETIC THEORY
#TRANSPORT THEORY
..CHAPMAN-ENSKOG THEORY
..EYRING THEORY
..MIXING LENGTH FLOW THEORY
RT BOLTZMANN TRANSPORT EQUATION
DIFFUSION THEORY
GAS TRANSPORT
INTEGRAL EQUATIONS
MOLECULAR INTERACTIONS
MONTE CARLO METHOD

POLLUTION TRANSPORT
% THEORIES
% TRANSPORT VEHICLES
O204 0207
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW
RT CRAWLER TRACTORS
GROUND EFFECT MACHINES
RAPID TRANSIT SYSTEMS
SHIPS
TRANSPORT AIRCRAFT
% VEHICLES
TRANSPORTATION
3404 0204 1102 1103
GS #TRANSPORTATION
..AIR TRANSPORTATION
..MARINE TRANSPORTATION
..RAIL TRANSPORTATION
..RAPID TRANSIT SYSTEMS
..SPACE TRANSPORTATION
..ADVANCED LAUNCH SYSTEM (STS)
..URBAN TRANSPORTATION
RT ARTIFICIAL HARBORS
AUTOMATED GUIDEWAY TRANSIT VEHICLES
AUTOMATED TRANSIT VEHICLES
CARGO
CONTRACTORS
CONVEYORS
DEEPWATER TERMINALS
DELIVERY
DISTRIBUTING
% DISTRIBUTION
ELECTRIC AUTOMOBILES
EVACUATING (TRANSPORTATION)
FREIGHT COSTS
FREIGHTERS
HANDLING EQUIPMENT
HAULING
HIGHWAYS
LOGISTICS
MATERIALS HANDLING
MISSILES
MOTOR VEHICLES
OFFSHORE DOCKING
OFFSHORE PLATFORMS
PACKAGING
PASSENGERS
PIPELINES
RIDING QUALITY
ROADS
ROUTES

TRANSPORTATION ENERGY
O204 1103 1502 2701 2802 3404
RT ALLOCATIONS
CARGO
COMMERCIAL ENERGY
DISTRIBUTING
DOMESTIC ENERGY
ECONOMIC FACTORS
% ENERGY
ENERGY CONVERSION
ENGINES
FUELS
HAULING
INDUSTRIAL ENERGY
SHIPS
% TANKERS
TRUCKS

TRANSPORTATION NETWORKS
3404
RT HIGHWAYS
INTERSECTIONS
% NETWORKS
RAPID TRANSIT SYSTEMS
ROADS
TRANSPORTATION

TRANSPORTER
1103 1104
GS SURFACE VEHICLES
#TRANSPORTER
RT % CONTAINERS
% VEHICLES

TRANSPUTERS
O801 O802
GS DATA PROCESSING EQUIPMENT
.COMPUTERS
.#TRANSPUTERS
RT ARCHITECTURE (COMPUTERS)
DISTRIBUTED PROCESSING
INTERPROCESSOR COMMUNICATION

```

# NASA THESAURUS HIERARCHICAL UPDATE

MICROPROCESSORS  
PARALLEL PROCESSING (COMPUTERS)

TRANSURANIUM ELEMENTS

1703 2406  
GS CHEMICAL ELEMENTS  
.ACTINIDE SERIES  
.#TRANSURANIUM ELEMENTS

...AMERICIUM  
...AMERICIUM ISOTOPES  
...AMERICIUM 241  
...BERKELIUM  
...CALIFORNIUM  
...CALIFORNIUM ISOTOPES  
...CURIUM  
...CURIUM ISOTOPES  
...CURIUM 242  
...CURIUM 244  
...EINSTEINIUM  
...FERMIUM  
...LAWRENCIUM  
...MENDELEVIUM  
...NEPTUNIUM  
...NEPTUNIUM ISOTOPES  
...NOBELIUM  
...PLUTONIUM  
...PLUTONIUM ISOTOPES  
...PLUTONIUM 238  
...PLUTONIUM 239  
...PLUTONIUM 240  
...PLUTONIUM 241  
...PLUTONIUM 244  
...SERGENIUM  
...NUCLIDES  
...ISOTOPES  
...RADIOACTIVE ISOTOPES  
...#TRANSURANIUM ELEMENTS  
...AMERICIUM  
...AMERICIUM ISOTOPES  
...AMERICIUM 241  
...BERKELIUM  
...CALIFORNIUM  
...CALIFORNIUM ISOTOPES  
...CURIUM  
...CURIUM ISOTOPES  
...CURIUM 242  
...CURIUM 244  
...EINSTEINIUM  
...FERMIUM  
...LAWRENCIUM  
...MENDELEVIUM  
...NEPTUNIUM  
...NEPTUNIUM ISOTOPES  
...NOBELIUM  
...PLUTONIUM

...PLUTONIUM ISOTOPES  
...PLUTONIUM 238  
...PLUTONIUM 239  
...PLUTONIUM 240  
...PLUTONIUM 241  
...PLUTONIUM 244  
...SERGENIUM  
METALS  
.ACTINIDE SERIES  
.#TRANSURANIUM ELEMENTS  
...AMERICIUM  
...AMERICIUM ISOTOPES  
...AMERICIUM 241  
...BERKELIUM  
...CALIFORNIUM  
...CALIFORNIUM ISOTOPES  
...CURIUM  
...CURIUM ISOTOPES  
...CURIUM 242  
...CURIUM 244  
...EINSTEINIUM  
...FERMIUM  
...LAWRENCIUM  
...MENDELEVIUM  
...NEPTUNIUM  
...NEPTUNIUM ISOTOPES  
...NOBELIUM  
...PLUTONIUM  
...PLUTONIUM ISOTOPES  
...PLUTONIUM 238  
...PLUTONIUM 239  
...PLUTONIUM 240  
...PLUTONIUM 241  
...PLUTONIUM 244  
...SERGENIUM  
...TRANSITION METALS  
RT

TRANSVERSE ACCELERATION  
0401 0502 2311  
GS RATES (PER TIME)  
.ACCELERATION (PHYSICS)  
.#TRANSVERSE ACCELERATION  
RT % ACCELERATION  
ACCELERATION STRESSES (PHYSIOLOGY)  
ANGULAR ACCELERATION

TRANSVERSE LOADS  
0902 1001 1002 2308 3203  
GS LOADS (FORCES)  
.#TRANSVERSE LOADS  
RT DYNAMIC LOADS  
FORCE DISTRIBUTION  
LOAD DISTRIBUTION (FORCES)  
LOADING MOMENTS  
SHEAR STRESS

STATIC LOADS  
STRESS DISTRIBUTION  
STRESSES  
TRANSVERSE OSCILLATION  
0710 2301 2309 2402  
UF TRANSVERSE VIBRATION  
GS OSCILLATIONS  
.#TRANSVERSE OSCILLATION  
..H WAVES  
GAMMA RAYS  
HARMONIC OSCILLATION  
LATERAL OSCILLATION  
STABLE OSCILLATIONS  
TRANSIENT OSCILLATIONS  
TRANSVERSE VIBRATION  
USE TRANSVERSE OSCILLATION  
TRANSVERSE WAVES  
0710 2309 2402 2501  
GS #TRANSVERSE WAVES  
..H WAVES  
ELASTIC WAVES  
ELECTROMAGNETIC RADIATION  
GAMMA RAYS  
LONGITUDINAL WAVES  
MAGNETOHYDRODYNAMIC FLOW  
PLANE WAVES  
RADIO WAVES  
S WAVES  
SH WAVES  
VIBRATION MODE  
WAVE PACKETS  
% WAVES

TRANSVERSELY EXCITED ATMOSPHERIC LASERS  
USE TEA LASERS

TRAP PROGRAM  
2307 2402 2502  
GS PROGRAMS  
.#TRAP PROGRAM  
RT PLASMA CONTROL  
% RADIATION

TRAPATT DEVICES  
0905 1002  
UF TRAPPED PLASMA AVALANCHE TRIGGERED  
TRANSIT  
GS ELECTRONIC EQUIPMENT  
.SOLID STATE DEVICES  
..SEMICONDUCTOR DEVICES  
..#TRAPATT DEVICES  
RT AVALANCHE DIODES

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                                    |                                     |                                              |
|------------------------------------|-------------------------------------|----------------------------------------------|
| TRAVELING WAVE AMPLIFIERS          | 0710 2301 2309 2402                 | RECOMMENDED--CONSULT THE TERMS LISTED BELOW) |
| 0903 0905                          | GS #TRAVELING WAVES                 |                                              |
| GS AMPLIFIERS                      | .SOLITARY WAVES                     |                                              |
| RT #TRAVELING WAVE AMPLIFIERS      | RT BACKWARD WAVES                   | RT CONIFERS                                  |
| RT AMPLIFIER DESIGN                | ELASTIC WAVES                       | TREES (MATHEMATICS)                          |
| POWER AMPLIFIERS                   | ELECTROMAGNETIC RADIATION           | TREES (PLANTS)                               |
| TRAVELING WAVE TUBES               | NONRESONANCE                        |                                              |
|                                    | PHASE VELOCITY                      | TREES (MATHEMATICS)                          |
| TRAVELING WAVE MASERS              | PLANE WAVES                         | 1902                                         |
| 0710 1601 2306 2402                | RADIO WAVES                         | GS #TREES (MATHEMATICS)                      |
| GS STIMULATED EMISSION DEVICES     |                                     | .FAULT TREES                                 |
| .MASERS                            |                                     | RT ANALYSIS (MATHEMATICS)                    |
| .#TRAVELING WAVE MASERS            |                                     | CIRCUITS                                     |
| RT AMPLIFIERS                      | RT % BUCKETS                        | GRAPH THEORY                                 |
| CAVITY RESONATORS                  | % CONTAINERS                        | GRAPHS (CHARTS)                              |
| COHERENT ELECTROMAGNETIC RADIATION | % PLATES                            | PETRI NETS                                   |
|                                    |                                     | SNEAK CIRCUIT ANALYSIS                       |
|                                    |                                     | TOPOLOGY                                     |
| TRAVELING WAVE MODULATION          | TREADMILLS                          | % TREES                                      |
| 0702 0710 2402                     | O404 0502 1504                      |                                              |
| GS MODULATION                      | RT PHYSICAL EXERCISE                | TREES (PLANTS)                               |
| RT #TRAVELING WAVE MODULATION      | PHYSICAL FITNESS                    | O409                                         |
| RT LASERS                          | PHYSICAL WORK                       | GS PLANTS (BOTANY)                           |
| LIGHT MODULATION                   | PHYSIOLOGICAL TESTS                 | #TREES (PLANTS)                              |
| WAVE DIFFRACTION                   |                                     | ..CITRUS TREES                               |
|                                    |                                     | ..CONIFERS                                   |
| TRAVELING WAVE TUBES               | TREADS                              | ..DECIDUOUS TREES                            |
| 0710 0905 2309 2402                | 1504                                | BALSA                                        |
| UF CRESTATONS                      | RT STAIRWAYS                        | CANOPIES (VEGETATION)                        |
| HELIX TUBES                        | TIRES                               | CHAPARRAL                                    |
| ELECTRON TUBES                     | VEHICULAR TRACKS                    | CLEARINGS (OPENINGS)                         |
| .VACUUM TUBES                      |                                     | DEFOLIANTS                                   |
| ..MICROWAVE TUBES                  | TREAT (TEST FACILITY)               | DEFOLIATION                                  |
| ..#TRAVELING WAVE TUBES            | USE TRANSIENT REACTOR TEST FACILITY | DENDROCHRONOLOGY                             |
| ...BACKWARD WAVE TUBES             | % TREATMENT                         | FORESTS                                      |
| ....HELITRONS                      | O404 0405 3404 3407                 | GEBOTANY                                     |
| ....CARCINOTRONS                   | SN (USE OF A MORE SPECIFIC TERM IS  | HERBICIDES                                   |
| MICROWAVE EQUIPMENT                | RECOMMENDED--CONSULT THE TERMS      | LOGGING (INDUSTRY)                           |
| .MICROWAVE TUBES                   | LISTED BELOW)                       | MASONITE (TRADEMARK)                         |
| .#TRAVELING WAVE TUBES             | UF CONDITIONING (TREATING)          | ORCHARDS                                     |
| ...BACKWARD WAVE TUBES             | RT AIR CONDITIONING                 | PHREATOPHYTES                                |
| ....HELITRONS                      | CLINICAL MEDICINE                   | PLYWOOD                                      |
| ...CARCINOTRONS                    | HEAT TREATMENT                      | SILVICULTURE                                 |
| BACKWARD WAVES                     | PREWHITENING                        | TIMBER IDENTIFICATION                        |
| BRILLOUIN FLOW                     | SEWAGE TREATMENT                    | TIMBER INVENTORY                             |
| CROSSED FIELD AMPLIFIERS           | SURFACE TREATMENT                   | TIMBER VIGOR                                 |
| CYCLOTRON RESONANCE DEVICES        | THERMOMECHANICAL TREATMENT          | TIMBERLINE                                   |
| ELECTRON BUNCHING                  | WASTE TREATMENT                     | % TREES                                      |
| MAGNETOSTATIC AMPLIFIERS           | WATER TREATMENT                     | VEGETATION                                   |
| MAGNETRONS                         |                                     | WOOD                                         |
| MICROWAVE OSCILLATORS              | TREE RING DATING                    |                                              |
| OSCILLATIONS                       | USE DENDROCHRONOLOGY                | TRELLIS CODING                               |
| SCALLOPING                         | % TREES                             | O702                                         |
| TRAVELING WAVE AMPLIFIERS          | O409 1902                           | GS CODING                                    |
|                                    | SN (USE OF A MORE SPECIFIC TERM IS  | .SIGNAL ENCODING                             |
| TRAVELING WAVES                    |                                     | ..TRELLIS CODING                             |

```

RT   BINARY CODES
CHANNEL NOISE
%   CODES
CONCATENATED CODES
CONVOLUTION INTEGRALS
PHASE MODULATION
PHASE SHIFT KEYING

TREMDRS
O405 O408 1308
RT   EARTHQUAKE RESISTANCE
EARTHQUAKES
PARALYSIS
PARKINSON DISEASE
ROUSE BELTS

TREND ANALYSIS
3402 3406
RT % ANALYZING
FAILURE ANALYSIS
PERFORMANCE PREDICTION
PREDICTION ANALYSIS TECHNIQUES
REGULARITY
RELIABILITY ANALYSIS
STATISTICAL ANALYSIS
TIME SERIES ANALYSIS
TRENDS

TRENDS
3402
RT   EXTRAPOLATION
FORECASTING
GROWTH
PERIODIC VARIATIONS
%   PROJECTION
TIME SERIES ANALYSIS
TEND ANALYSIS

TRESCA FLOW
1202
GS   FLUID FLOW
.PLASTIC FLOW
.#TRESCA FLOW
RT   DUCTILITY
STABILITY
YIELD POINT

TRIACETIN
1808 1811
GS   ACETATES
#TRIACETIN
ESTERS
#TRIACETIN
RT   ACETIC ACID
GLYCEROLS

RT   BINARY CODES
CHANNEL NOISE
%   CODES
CONCATENATED CODES
CONVOLUTION INTEGRALS
PHASE MODULATION
PHASE SHIFT KEYING

TREMDRS
O405 O408 1308
RT   EARTHQUAKE RESISTANCE
EARTHQUAKES
PARALYSIS
PARKINSON DISEASE
ROUSE BELTS

TREND ANALYSIS
3402 3406
RT % ANALYZING
FAILURE ANALYSIS
PERFORMANCE PREDICTION
PREDICTION ANALYSIS TECHNIQUES
REGULARITY
RELIABILITY ANALYSIS
STATISTICAL ANALYSIS
TIME SERIES ANALYSIS
TRENDS

TRENDS
3402
RT   EXTRAPOLATION
FORECASTING
GROWTH
PERIODIC VARIATIONS
%   PROJECTION
TIME SERIES ANALYSIS
TEND ANALYSIS

TRESCA FLOW
1202
GS   FLUID FLOW
.PLASTIC FLOW
.#TRESCA FLOW
RT   DUCTILITY
STABILITY
YIELD POINT

TRIACETIN
1808 1811
GS   ACETATES
#TRIACETIN
ESTERS
#TRIACETIN
RT   ACETIC ACID
GLYCEROLS

PLASTICIZERS
SOLVENTS

TRIAMINOGUANIDINENITRATE
USE TAGN

O403 1808
GS   AMINES
.DIAMINES
..GUANIDINES
..#TRIAMINOGUANIDINIUM AZIDE
NITROGEN COMPOUNDS
.AZIDES (ORGANIC)
.#TRIAMINOGUANIDINIUM AZIDE

TRIAMINOTRINITROBENZENE
USE TATB

TRIANGLES
1902
GS   GEOMETRY
.EUCLIDEAN GEOMETRY
..POLYGONS
..#TRIANGLES
RT   TETRAHEDRONS
TRIGONOMETRY

TRIANGULAR WINGS
USE DELTA WINGS

TRIANGULATION
O709 1304 1308 1901
RT   ANGLES (GEOMETRY)
MAPPING
NAVIGATION
TRIGONOMETRY
WILDLIFE RADIOLOCATION

TRIATOMIC MOLECULES
O603 1203 2401 2405
GS   MOLECULES
.POLYATOMIC MOLECULES
.#TRIATOMIC MOLECULES
RT   DIATOMIC MOLECULES

TRIAxIAL STRESSES
3203
UF   TRIAXIALITY
GS   STRESSES
#TRIAxIAL STRESSES
RT   MECHANICAL PROPERTIES
TENSILE STRESS

TRIAxIALITY

USE TRIAXIAL STRESSES

TRIBOLIA
O402 O404
GS   ANIMALS
.INVERTEBRATES
..ARTHROPODS
...INSECTS
....COLEOPTERA
.....BEETLES
.....#TRIBOLIA

TRIBOLOGY
1503
RT   ABRASION
CORROSION
EROSION
EROSIVE BURNING
FRETTING
FRICTION
INTERFACIAL TENSION
LUBRICATION
TRIBOLUMINESCENCE
WEAR

TRIBOLUMINESCENCE
O605
GS   EMISSION
.LIGHT EMISSION
..LUMINESCENCE
...PHOTOLUMINESCENCE
...#TRIBOLUMINESCENCE
RT   FLUORESCENCE
FRICTION
MECHANICAL PROPERTIES
PHOTOLUMINESCENT BANDS
STRESSES
TRIBOLOGY

TRIBUTARIES
1305
RT   DRAINAGE PATTERNS
EARTH RESOURCES
ESTUARIES
RIVERS

TRICHLORIDES
USE CHLORIDES

TRIDENT AIRCRAFT
USE DH 121 AIRCRAFT

TRIDENT SUBMARINE
3401
GS   WATER VEHICLES

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## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

[illegible]



[illegible]

TRANSPORTATION ENERGY  
 TRUNCATION (MATHEMATICS)  
 USE APPROXIMATION  
 TRUNCATION ERRORS  
 O802 1902 1905 3501  
 GS ANALYSIS (MATHEMATICS)  
 . NUMERICAL ANALYSIS  
 . #TRUNCATION ERRORS  
 ERRORS  
 #TRUNCATION ERRORS  
 RT PRECISION  
 RT  
 TRUNKS (LINES)  
 USE TRANSMISSION LINES  
 TRUNNIONS  
 USE SHAFTS (MACHINE ELEMENTS)  
 TRUSSES  
 3202 3203  
 GS STRUCTURAL MEMBERS  
 #TRUSSES  
 RT ARCHES  
 BEAMS (SUPPORTS)  
 CONSTRUCTION INDUSTRY  
 FRAMES  
 GIRDERS  
 I BEAMS  
 LOOPS  
 MAXWELL-MOHR METHOD  
 MECHANICS  
 % STRUCTURES  
 STRUTS  
 SUPPORTS  
 TIMOSHENKO BEAMS  
 TRYPANOSOME  
 O402 0407  
 GS ANIMALS  
 . PROTOZOA  
 . . FLAGELLATA  
 . . #TRYPANOSOME  
 MICROORGANISMS  
 . PROTOZOA  
 . . FLAGELLATA  
 . . #TRYPANOSOME  
 PARASITES  
 #TRYPANOSOME  
 RT PARASITIC DISEASES  
 TRYPSIN  
 O403 1808  
 GS BIOPOLYMERS

. PROTEINS  
 . . ENZYMES  
 . . #TRYPSIN  
 ORGANIC COMPOUNDS  
 . PROTEINS  
 . . ENZYMES  
 . . #TRYPSIN  
 RT PANCREAS  
 TRYPTAMINES  
 O403 1808  
 GS AMINES  
 #TRYPTAMINES  
 . . SEROTONIN  
 TRYPTOPHAN  
 O403 1808  
 GS ACIDS  
 . AMINO ACIDS  
 . #TRYPTOPHAN  
 . CARBOXYLIC ACIDS  
 . #TRYPTOPHAN  
 NITROGEN COMPOUNDS  
 #TRYPTOPHAN  
 ORGANIC COMPOUNDS  
 . AMINO ACIDS  
 . #TRYPTOPHAN  
 . CARBOXYLIC ACIDS  
 . #TRYPTOPHAN  
 . CYCLIC COMPOUNDS  
 . . HETEROCYCLIC COMPOUNDS  
 . . AZOLES  
 . . . . PYRROLES  
 . . . . . INDOLES  
 . . . . . #TRYPTOPHAN  
 TS-11 AIRCRAFT  
 O201  
 UF ISKRA AIRCRAFT  
 POLISH TS-11 AIRCRAFT  
 GS JET AIRCRAFT  
 #TS-11 AIRCRAFT  
 MONOPLANES  
 #TS-11 AIRCRAFT  
 TRAINING AIRCRAFT  
 #TS-11 AIRCRAFT  
 RT % AIRCRAFT  
 TSR-2 AIRCRAFT  
 O201 0207  
 UF BAC TSR 2 AIRCRAFT  
 GS ATTACK AIRCRAFT  
 #TSR-2 AIRCRAFT  
 BAC AIRCRAFT  
 #TSR-2 AIRCRAFT

JET AIRCRAFT  
 #TSR-2 AIRCRAFT  
 MONOPLANES  
 #TSR-2 AIRCRAFT  
 OBSERVATION AIRCRAFT  
 #TSR-2 AIRCRAFT  
 RECONNAISSANCE AIRCRAFT  
 #TSR-2 AIRCRAFT  
 SUPERSONIC AIRCRAFT  
 #TSR-2 AIRCRAFT  
 TERRAIN FOLLOWING AIRCRAFT  
 #TSR-2 AIRCRAFT  
 RT % AIRCRAFT  
 TSUNAMI WAVES  
 1306 1308  
 RT EARTH MOVEMENTS  
 EARTHQUAKE DAMAGE  
 EARTHQUAKES  
 FRONTAL WAVES  
 SEISMIC WAVES  
 SHOCK WAVES  
 SURFACE WAVES  
 TIDAL WAVES  
 WATER WAVES  
 TTL INTEGRATED CIRCUITS  
 O902 1001 1002  
 SN (TRANSISTOR-TRANSISTOR-LOGIC  
 INTEGRATED CIRCUITS)  
 UF TRANSISTOR-TRANSISTOR-LOGIC INTEG  
 CIRCUITS  
 GS CIRCUITS  
 . INTEGRATED CIRCUITS  
 . #TTL INTEGRATED CIRCUITS  
 ELECTRONIC PACKAGING  
 LARGE SCALE INTEGRATION  
 MICROMINIATURIZATION  
 MOLECULAR ELECTRONICS  
 TRANSISTOR CIRCUITS  
 TU-104 AIRCRAFT  
 O201 0204  
 UF CAMEL AIRCRAFT  
 GS COMMERCIAL AIRCRAFT  
 #TU-104 AIRCRAFT  
 JET AIRCRAFT  
 #TU-104 AIRCRAFT  
 MONOPLANES  
 #TU-104 AIRCRAFT  
 PASSENGER AIRCRAFT  
 #TU-104 AIRCRAFT  
 TUPOLEV AIRCRAFT  
 #TU-104 AIRCRAFT  
 RT % AIRCRAFT

# NASA THESAURUS HIERARCHICAL UPDATE

## TU-154 AIRCRAFT

## RT % AIRCRAFT

TU-121 ENGINE  
2808  
GS  
ENGINES  
.ROCKET ENGINES  
..SOLID PROPELLANT ROCKET ENGINES  
..#TU-121 ENGINE

TU-154 AIRCRAFT  
0201 0204  
GS

COMMERCIAL AIRCRAFT  
#TU-154 AIRCRAFT  
TRANSPORT AIRCRAFT  
#TU-154 AIRCRAFT  
TUPOLEV AIRCRAFT  
#TU-154 AIRCRAFT

## TU-124 AIRCRAFT

## RT % AIRCRAFT

0201 0204  
UF COOKPOT AIRCRAFT  
GS COMMERCIAL AIRCRAFT  
#TU-124 AIRCRAFT  
JET AIRCRAFT  
#TU-124 AIRCRAFT  
MONOPLANES  
#TU-124 AIRCRAFT  
PASSENGER AIRCRAFT  
#TU-124 AIRCRAFT  
TRANSPORT AIRCRAFT  
#TU-124 AIRCRAFT  
TUPOLEV AIRCRAFT  
#TU-124 AIRCRAFT  
RT % AIRCRAFT  
TURBOFAN ENGINES

AIRCRAFT DESIGN  
CARGO AIRCRAFT  
JET AIRCRAFT  
PASSENGER AIRCRAFT  
TU-104 AIRCRAFT

## TUBE ANODES

## 0905

## GS ELECTRODES

.ANODES  
..#TUBE ANODES  
CATHODES  
ELECTRODE MATERIALS  
ELECTRON GUNS

## TUBE CATHODES

## 0905

## GS ELECTRODES

.CATHODES  
..#TUBE CATHODES  
...COLD CATHODES  
...HOT CATHODES  
...PHOTOCATHODES  
...THERMIONIC CATHODES  
...TUNNEL CATHODES  
COLD CATHODE TUBES  
ELECTRON GUNS  
HOLLOW CATHODES

## TUBE GRIDS

## 0905

## GS ELECTRODES

#TUBE GRIDS  
RT BIAS  
ELECTRON GUNS  
ELECTRON TUBES  
% GRIDS  
IONIZERS

## TUBE HEAT EXCHANGERS

## 0905

3303 3304 3501  
GS HEAT EXCHANGERS  
#TUBE HEAT EXCHANGERS  
RT REGENERATORS

## TUBE LASERS

## 1601

RT CHEMICAL LASERS  
GASDYNAMIC LASERS  
LASER OUTPUTS  
PULSED LASERS  
SHOCK TUBES  
WAVEGUIDE LASERS

## TUBERCULOSIS

## 0405

GS DISEASES  
.INFECTIOUS DISEASES  
..BACTERIAL DISEASES  
..#TUBERCULOSIS  
.RESPIRATORY DISEASES  
.#TUBERCULOSIS

## % TUBES

0801 0903 0905 1504 3203  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)

## RT BOURDON TUBES

BRONCHI  
BURETTES  
CANNULAE  
CAPILLARY TUBES  
CIRCULAR TUBES  
DUCTS  
ELECTRON TUBES  
EUSTACHIAN TUBES  
HILSCH TUBES  
HOSES  
LININGS  
MANIFOLDS  
MICROWAVE TUBES  
PIPES (TUBES)  
PITOT TUBES  
SHOCK TUBES  
SIPHONS  
TRACHEA  
VENTURI TUBES

## TUBING

## USE PIPES (TUBES)

## TUMBLING MOTION

## 0101 3006 3107 3110 3009

RT ATTITUDE STABILITY  
DESTABILIZATION  
MIXERS  
% MOTION  
ROTATING ENVIRONMENTS

SATELLITE ROTATION  
% SEPARATION  
SPACECRAFT MOTION  
SPACECRAFT STABILITY

TUMORS  
O404  
GS  
DISEASES  
#TUMORS  
..NEOPLASMS  
...CANCER  
....LEUKEMIAS  
CYSTS  
RT  
OCCUPATIONAL DISEASES

TUNABLE LASERS  
1601  
GS  
STIMULATED EMISSION DEVICES  
..LASERS  
..#TUNABLE LASERS  
DBR LASERS  
DIFFRACTION RADIATION  
LIGHT MODULATION  
OPTICAL COMMUNICATION  
TUNING  
WIGGLER MAGNETS

TUNDRA  
1305  
GS  
LAND  
..PLAINS  
..#TUNDRA  
LANDFORMS  
#TUNDRA  
RT  
ARCTIC REGIONS  
ASIA  
GEOGRAPHY  
NORTH AMERICA

TUNERS  
O701 0702 0705 0710 2301  
GS  
#TUNERS  
..WAVEGUIDE TUNERS  
RADIO RECEIVERS  
RESONANCE PROBES  
RESONANT FREQUENCIES  
TELEVISION RECEIVERS

TUNGSTATES  
O603  
GS  
TUNGSTEN COMPOUNDS  
#TUNGSTATES  
..CALCIUM TUNGSTATES  
..LEAD TUNGSTATES  
..ZINC TUNGSTATES

TUNGSTEN  
O603 1703  
UF  
GS  
WOLFRAM  
CHEMICAL ELEMENTS  
#TUNGSTEN  
METALS  
..REFRACTORY METALS  
..#TUNGSTEN  
..TRANSITION METALS  
..#TUNGSTEN  
REFRACTORY MATERIALS  
REFRACTORY METALS  
..#TUNGSTEN

TUNGSTEN ALLOYS  
1701 1704  
GS  
ALLOYS  
..HEAT RESISTANT ALLOYS  
..REFRACTORY METAL ALLOYS  
..#TUNGSTEN ALLOYS  
REFRACTORY MATERIALS  
REFRACTORY METAL ALLOYS  
..#TUNGSTEN ALLOYS  
RT  
HAFNIUM ALLOYS  
STELLITE (TRADEMARK)

TUNGSTEN CARBIDES  
O603 1804  
GS  
CARBON COMPOUNDS  
..CARBIDES  
..#TUNGSTEN CARBIDES  
TUNGSTEN COMPOUNDS  
#TUNGSTEN CARBIDES

TUNGSTEN CHLORIDES  
O603 1804  
GS  
HALOGEN COMPOUNDS  
..CHLORINE COMPOUNDS  
..CHLORIDES  
..#TUNGSTEN CHLORIDES  
..HALIDES  
..CHLORIDES  
..#TUNGSTEN CHLORIDES  
..METAL HALIDES  
...TUNGSTEN HALIDES  
...#TUNGSTEN CHLORIDES  
TUNGSTEN COMPOUNDS  
TUNGSTEN HALIDES  
..#TUNGSTEN CHLORIDES

TUNGSTEN COMPOUNDS  
O603 1804  
GS  
#TUNGSTEN COMPOUNDS  
..TUNGSTATES

..CALCIUM TUNGSTATES  
..LEAD TUNGSTATES  
..ZINC TUNGSTATES  
..TUNGSTEN CARBIDES  
..TUNGSTEN HALIDES  
..TUNGSTEN CHLORIDES  
..TUNGSTEN FLUORIDES  
..TUNGSTEN OXIDES  
..SCHEELITE  
..CHEMICAL COMPOUNDS  
RT %  
% GROUP 6B COMPOUNDS  
% METAL COMPOUNDS

TUNGSTEN FLUORIDES  
O603 1804  
GS  
HALOGEN COMPOUNDS  
..FLUORINE COMPOUNDS  
..FLUORIDES  
...METAL FLUORIDES  
...#TUNGSTEN FLUORIDES  
..HALIDES  
..METAL HALIDES  
...TUNGSTEN HALIDES  
...#TUNGSTEN FLUORIDES  
TUNGSTEN COMPOUNDS  
TUNGSTEN HALIDES  
..#TUNGSTEN FLUORIDES

TUNGSTEN HALIDES  
O603 1804  
GS  
HALOGEN COMPOUNDS  
..HALIDES  
..METAL HALIDES  
..#TUNGSTEN HALIDES  
...TUNGSTEN CHLORIDES  
...TUNGSTEN FLUORIDES  
TUNGSTEN COMPOUNDS  
#TUNGSTEN HALIDES  
..TUNGSTEN CHLORIDES  
..TUNGSTEN FLUORIDES

TUNGSTEN INERT GAS WELDING  
USE GAS TUNGSTEN ARC WELDING

TUNGSTEN ISOTOPE  
O603 1703  
GS  
METALS  
..REFRACTORY METALS  
..#TUNGSTEN ISOTOPE  
..TRANSITION METALS  
..#TUNGSTEN ISOTOPE  
REFRACTORY MATERIALS  
REFRACTORY METALS  
..#TUNGSTEN ISOTOPE

[illegible]

COMPRESSOR BLADES  
 ENGINE PARTS  
 FAN BLADES  
 ROTOR BLADES (TURBOMACHINERY)  
 STATOR BLADES  
 TURBINES  
 TURBINE ENGINES  
 O202 2801 2805  
 GS  
 #TURBINE ENGINES  
 ..GAS TURBINE ENGINES  
 ..JET ENGINES  
 ....RAMJET ENGINES  
 ....LOW VOLUME RAMJET ENGINES  
 ....PULSEJET ENGINES  
 ....SUPERSONIC COMBUSTION RAMJET ENGINES  
 .....TURBORAMJET ENGINES  
 .....T-63 ENGINE  
 .....T-76 ENGINE  
 ....TURBOJET ENGINES  
 .....BRISTOL-SIDDELEY OLYMPUS 593 ENGINE  
 .....BRISTOL-SIDDELEY VIPER ENGINE  
 .....DUCTED FAN ENGINES  
 .....J-33 ENGINE  
 .....J-34 ENGINE  
 .....J-47 ENGINE  
 .....J-52 ENGINE  
 .....J-57 ENGINE  
 .....J-57-P-20 ENGINE  
 .....J-65 ENGINE  
 .....J-69-T-25 ENGINE  
 .....J-71 ENGINE  
 .....J-73 ENGINE  
 .....J-75 ENGINE  
 .....J-79 ENGINE  
 .....J-85 ENGINE  
 .....J-93 ENGINE  
 .....RA-28 ENGINE  
 .....TURBOFAN ENGINES  
 .....BRISTOL-SIDDELEY BS 53 ENGINE  
 .....CF-700 ENGINE  
 .....CONVERTIBLE FAN-SHAFT ENGINES  
 .....J-97 ENGINE  
 .....TF-30 ENGINE  
 .....TF-41 ENGINE  
 .....TURBOPROP ENGINES  
 .....T-34 ENGINE  
 .....T-38 ENGINE  
 .....T-53 ENGINE  
 .....T-56 ENGINE  
 .....T-64 ENGINE  
 .....T-74 ENGINE  
 RT  
 AIRCRAFT ENGINES  
 AUTOMOBILE ENGINES  
 CONVERGENT NOZZLES  
 GAS BEARINGS  
 INTEGRAL ROCKET RAMJETS  
 TORPEDO ENGINES  
 TURBINE EXHAUST NOZZLES  
 1504 2805 2806 2808  
 GS  
 EXHAUST NOZZLES  
 #TURBINE EXHAUST NOZZLES  
 CONICAL NOZZLES  
 CONVERGENT-DIVERGENT NOZZLES  
 TURBINE INSTRUMENTS  
 1202 1203 1406 3501  
 RT  
 FLOWMETERS  
 % INSTRUMENTS  
 TURBOMACHINERY  
 TURBINE PUMPS  
 1501 1504 2801 2805 2808  
 UF  
 TURBOPUMPS  
 GS  
 PUMPS  
 .AXIAL FLOW PUMPS  
 .#TURBINE PUMPS  
 TURBOMACHINERY  
 #TURBINE PUMPS  
 CENTRIFUGAL PUMPS  
 FUEL PUMPS  
 JET PUMPS  
 PREBURNERS  
 TURBINES  
 TURBOCOMPRESSORS  
 RT  
 TURBINE WHEELS  
 O104 1504 2801 2805 2808  
 UF  
 ROTOR DISKS  
 TURBOROTORS  
 GS  
 ROTATING BODIES  
 .ROTORS  
 .#TURBINE WHEELS  
 WHEELS  
 #TURBINE WHEELS  
 COMPRESSOR ROTORS  
 ENGINE PARTS  
 HYDRAULIC EQUIPMENT  
 IMPELLERS  
 TURBINES  
 TURBOMACHINE BLADES  
 WATER WHEELS  
 TURBINES  
 O301 1504 2801 2805  
 GS  
 TURBOMACHINERY  
 #TURBINES  
 ..AXIAL FLOW TURBINES  
 ..GAS TURBINES  
 ..SHROUDED TURBINES  
 ..STEAM TURBINES  
 ..SUPERSONIC TURBINES  
 ..TWO STAGE TURBINES  
 ..WIND TURBINES  
 ...TIP VANES  
 ENGINES  
 GEOTHERMAL ENERGY CONVERSION  
 GEOTHERMAL ENERGY EXTRACTION  
 IMPELLERS  
 IMPULSE GENERATORS  
 JET ENGINE FUELS  
 JET PROPULSION  
 % NOZZLES  
 REFRACTORIES  
 ROTATING GENERATORS  
 ROTORS  
 STATORS  
 TURBINE BLADES  
 TURBINE PUMPS  
 TURBINE WHEELS  
 TURBOGENERATORS  
 TURBOSHAFTS  
 TURBO-SKYVAN AIRCRAFT  
 USE SC-7 AIRCRAFT  
 TURBOCHARGERS  
 USE SUPERCHARGERS  
 TURBOCOMPRESSORS  
 TURBOCOMPRESSORS  
 1202 1203 1504 2805 2808  
 UF  
 AXIAL COMPRESSORS  
 AXIAL FLOW COMPRESSORS  
 MULTISTAGE COMPRESSORS  
 TURBOCHARGERS  
 COMPRESSORS  
 #TURBOCOMPRESSORS  
 TURBOMACHINERY  
 #TURBOCOMPRESSORS  
 CENTRIFUGAL COMPRESSORS  
 CENTRIFUGAL PUMPS  
 COMPRESSOR BLADES  
 COMPRESSOR ROTORS  
 ROTATING STALLS  
 ROTORS  
 SUPERCHARGERS  
 TURBINES  
 O301 1504 2801 2805  
 GS  
 TURBOMACHINERY  
 #TURBINES  
 ..AXIAL FLOW TURBINES  
 ..GAS TURBINES  
 ..SHROUDED TURBINES  
 ..STEAM TURBINES  
 ..SUPERSONIC TURBINES  
 ..TWO STAGE TURBINES  
 ..WIND TURBINES  
 ...TIP VANES  
 ENGINES  
 GEOTHERMAL ENERGY CONVERSION  
 GEOTHERMAL ENERGY EXTRACTION  
 IMPELLERS  
 IMPULSE GENERATORS  
 JET ENGINE FUELS  
 JET PROPULSION  
 % NOZZLES  
 REFRACTORIES  
 ROTATING GENERATORS  
 ROTORS  
 STATORS  
 TURBINE BLADES  
 TURBINE PUMPS  
 TURBINE WHEELS  
 TURBOGENERATORS  
 TURBOSHAFTS  
 TURBO-SKYVAN AIRCRAFT  
 USE SC-7 AIRCRAFT  
 TURBOCHARGERS  
 USE SUPERCHARGERS  
 TURBOCOMPRESSORS  
 TURBOCOMPRESSORS  
 1202 1203 1504 2805 2808  
 UF  
 AXIAL COMPRESSORS  
 AXIAL FLOW COMPRESSORS  
 MULTISTAGE COMPRESSORS  
 TURBOCHARGERS  
 COMPRESSORS  
 #TURBOCOMPRESSORS  
 TURBOMACHINERY  
 #TURBOCOMPRESSORS  
 CENTRIFUGAL COMPRESSORS  
 CENTRIFUGAL PUMPS  
 COMPRESSOR BLADES  
 COMPRESSOR ROTORS  
 ROTATING STALLS  
 ROTORS  
 SUPERCHARGERS

SUPERSONIC COMPRESSORS  
TRANSONIC COMPRESSORS  
TURBINE PUMPS  
TURBOFANS

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|                                       |                                       |                                 |    |                       |
|---------------------------------------|---------------------------------------|---------------------------------|----|-----------------------|
| ..AIR BREATHING ENGINES               | ..J-93 ENGINE                         | ..TURBOMACHINE BLADES           | RT | ..T-78 ENGINE         |
| ..GAS TURBINE ENGINES                 | ..RA-28 ENGINE                        | ..TURBOMACHINE BLADES           | RT | ..TURBORAMJET ENGINES |
| ..JET ENGINES                         | ..TURBOFAN ENGINES                    | ..TURBOMACHINE BLADES           | RT | ..CONVERGENT NOZZLES  |
| ..#TURBOJET ENGINES                   | ..BRISTOL-SIDDELEY BS 53 ENGINE       | ..COMPRESSOR BLADES             | RT | ..HOUND DOG MISSILE   |
| ..BRISTOL-SIDDELEY OLYMPUS 593 ENGINE | ..CF-700 ENGINE                       | ..ROTOR BLADES (TURBOMACHINERY) | RT | ..JET AIRCRAFT        |
| ..BRISTOL-SIDDELEY VIPER ENGINE       | ..CONVERTIBLE FAN-SHAFT ENGINES       | ..STATOR BLADES                 | RT | ..MAACE MISSILES      |
| ..DUCTED FAN ENGINES                  | ..J-97 ENGINE                         | ..TURBINE BLADES                | RT | ..QUAIL MISSILE       |
| ..J-33 ENGINE                         | ..TF-30 ENGINE                        | ..AIRFOILS                      | RT | ..RAMJET ENGINES      |
| ..J-34 ENGINE                         | ..TF-41 ENGINE                        | % BLADES                        | RT | ..REGULUS MISSILE     |
| ..J-47 ENGINE                         | ..TURBOPROP ENGINES                   | % BUCKETS                       | RT |                       |
| ..J-57 ENGINE                         | ..T-34 ENGINE                         | CASCADE FLOW                    | RT |                       |
| ..J-57-P-20 ENGINE                    | ..T-38 ENGINE                         | FAN BLADES                      | RT |                       |
| ..J-65 ENGINE                         | ..T-53 ENGINE                         | IMPELLERS                       | RT |                       |
| ..J-69-T-25 ENGINE                    | ..T-56 ENGINE                         | MISTUNING (TURBOMACHINERY)      | RT |                       |
| ..J-71 ENGINE                         | ..T-64 ENGINE                         | PADDLES                         | RT |                       |
| ..J-73 ENGINE                         | ..T-74 ENGINE                         | ROTORS                          | RT |                       |
| ..J-75 ENGINE                         | ..T-78 ENGINE                         | TURBINE WHEELS                  | RT |                       |
| ..J-79 ENGINE                         | ..TURBORAMJET ENGINES                 | VANES                           | RT |                       |
| ..J-85 ENGINE                         | ..TURBINE ENGINES                     |                                 | RT |                       |
| ..J-93 ENGINE                         | ..GAS TURBINE ENGINES                 |                                 | RT |                       |
| ..RA-28 ENGINE                        | ..JET ENGINES                         |                                 | RT |                       |
| ..TURBOFAN ENGINES                    | ..#TURBOJET ENGINES                   |                                 | RT |                       |
| ..BRISTOL-SIDDELEY BS 53 ENGINE       | ..BRISTOL-SIDDELEY OLYMPUS 593 ENGINE |                                 | RT |                       |
| ..CF-700 ENGINE                       | ENGINE                                |                                 | RT |                       |
| ..CONVERTIBLE FAN-SHAFT ENGINES       | ..BRISTOL-SIDDELEY VIPER ENGINE       |                                 | RT |                       |
| ..J-97 ENGINE                         | ..DUCTED FAN ENGINES                  |                                 | RT |                       |
| ..TF-41 ENGINE                        | ..J-33 ENGINE                         |                                 | RT |                       |
| ..TURBOPROP ENGINES                   | ..J-34 ENGINE                         |                                 | RT |                       |
| ..T-53 ENGINE                         | ..J-47 ENGINE                         |                                 | RT |                       |
| ..T-56 ENGINE                         | ..J-52 ENGINE                         |                                 | RT |                       |
| ..T-64 ENGINE                         | ..J-57 ENGINE                         |                                 | RT |                       |
| ..T-74 ENGINE                         | ..J-65 ENGINE                         |                                 | RT |                       |
| ..TURBORAMJET ENGINES                 | ..J-69-T-25 ENGINE                    |                                 | RT |                       |
| ..INTERNAL COMBUSTION ENGINES         | ..J-71 ENGINE                         |                                 | RT |                       |
| ..GAS TURBINE ENGINES                 | ..J-73 ENGINE                         |                                 | RT |                       |
| ..JET ENGINES                         | ..J-75 ENGINE                         |                                 | RT |                       |
| ..#TURBOJET ENGINES                   | ..J-79 ENGINE                         |                                 | RT |                       |
| ..BRISTOL-SIDDELEY OLYMPUS 593 ENGINE | ..J-85 ENGINE                         |                                 | RT |                       |
| ..BRISTOL-SIDDELEY VIPER ENGINE       | ..J-93 ENGINE                         |                                 | RT |                       |
| ..DUCTED FAN ENGINES                  | ..RA-28 ENGINE                        |                                 | RT |                       |
| ..J-33 ENGINE                         | ..TURBOFAN ENGINES                    |                                 | RT |                       |
| ..J-34 ENGINE                         | ..BRISTOL-SIDDELEY BS 53 ENGINE       |                                 | RT |                       |
| ..J-47 ENGINE                         | ..CF-700 ENGINE                       |                                 | RT |                       |
| ..J-52 ENGINE                         | ..CONVERTIBLE FAN-SHAFT ENGINES       |                                 | RT |                       |
| ..J-57 ENGINE                         | ..J-97 ENGINE                         |                                 | RT |                       |
| ..J-57-P-20 ENGINE                    | ..TF-41 ENGINE                        |                                 | RT |                       |
| ..J-65 ENGINE                         | ..TURBOPROP ENGINES                   |                                 | RT |                       |
| ..J-69-T-25 ENGINE                    | ..T-34 ENGINE                         |                                 | RT |                       |
| ..J-71 ENGINE                         | ..T-38 ENGINE                         |                                 | RT |                       |
| ..J-73 ENGINE                         | ..T-53 ENGINE                         |                                 | RT |                       |
| ..J-75 ENGINE                         | ..T-56 ENGINE                         |                                 | RT |                       |
| ..J-79 ENGINE                         | ..T-64 ENGINE                         |                                 | RT |                       |
| ..J-85 ENGINE                         | ..T-74 ENGINE                         |                                 | RT |                       |
| ..TURBORAMJET ENGINES                 |                                       |                                 | RT |                       |
| ..INTERNAL COMBUSTION ENGINES         |                                       |                                 | RT |                       |
| ..GAS TURBINE ENGINES                 |                                       |                                 | RT |                       |
| ..JET ENGINES                         |                                       |                                 | RT |                       |
| ..#TURBOJET ENGINES                   |                                       |                                 | RT |                       |
| ..BRISTOL-SIDDELEY OLYMPUS 593 ENGINE |                                       |                                 | RT |                       |
| ..BRISTOL-SIDDELEY VIPER ENGINE       |                                       |                                 | RT |                       |
| ..DUCTED FAN ENGINES                  |                                       |                                 | RT |                       |
| ..J-33 ENGINE                         |                                       |                                 | RT |                       |
| ..J-34 ENGINE                         |                                       |                                 | RT |                       |
| ..J-47 ENGINE                         |                                       |                                 | RT |                       |
| ..J-52 ENGINE                         |                                       |                                 | RT |                       |
| ..J-57 ENGINE                         |                                       |                                 | RT |                       |
| ..J-57-P-20 ENGINE                    |                                       |                                 | RT |                       |
| ..J-65 ENGINE                         |                                       |                                 | RT |                       |
| ..J-69-T-25 ENGINE                    |                                       |                                 | RT |                       |
| ..J-71 ENGINE                         |                                       |                                 | RT |                       |
| ..J-73 ENGINE                         |                                       |                                 | RT |                       |
| ..J-75 ENGINE                         |                                       |                                 | RT |                       |
| ..J-79 ENGINE                         |                                       |                                 | RT |                       |
| ..J-85 ENGINE                         |                                       |                                 | RT |                       |
| ..TURBORAMJET ENGINES                 |                                       |                                 | RT |                       |
| ..INTERNAL COMBUSTION ENGINES         |                                       |                                 | RT |                       |
| ..GAS TURBINE ENGINES                 |                                       |                                 | RT |                       |
| ..JET ENGINES                         |                                       |                                 | RT |                       |
| ..#TURBOJET ENGINES                   |                                       |                                 | RT |                       |
| ..BRISTOL-SIDDELEY OLYMPUS 593 ENGINE |                                       |                                 | RT |                       |
| ..BRISTOL-SIDDELEY VIPER ENGINE       |                                       |                                 | RT |                       |
| ..DUCTED FAN ENGINES                  |                                       |                                 | RT |                       |
| ..J-33 ENGINE                         |                                       |                                 | RT |                       |
| ..J-34 ENGINE                         |                                       |                                 | RT |                       |
| ..J-47 ENGINE                         |                                       |                                 | RT |                       |
| ..J-52 ENGINE                         |                                       |                                 | RT |                       |
| ..J-57 ENGINE                         |                                       |                                 | RT |                       |
| ..J-57-P-20 ENGINE                    |                                       |                                 | RT |                       |
| ..J-65 ENGINE                         |                                       |                                 | RT |                       |
| ..J-69-T-25 ENGINE                    |                                       |                                 | RT |                       |
| ..J-71 ENGINE                         |                                       |                                 | RT |                       |
| ..J-73 ENGINE                         |                                       |                                 | RT |                       |
| ..J-75 ENGINE                         |                                       |                                 | RT |                       |
| ..J-79 ENGINE                         |                                       |                                 | RT |                       |
| ..J-85 ENGINE                         |                                       |                                 | RT |                       |
| ..TURBORAMJET ENGINES                 |                                       |                                 | RT |                       |
| ..INTERNAL COMBUSTION ENGINES         |                                       |                                 | RT |                       |
| ..GAS TURBINE ENGINES                 |                                       |                                 | RT |                       |
| ..JET ENGINES                         |                                       |                                 | RT |                       |
| ..#TURBOJET ENGINES                   |                                       |                                 | RT |                       |
| ..BRISTOL-SIDDELEY OLYMPUS            |                                       |                                 |    |                       |



ROTOR DYNAMICS  
SUPERCHARGERS  
TURBINE INSTRUMENTS

TURBOPROP AIRCRAFT  
O104 0201 2801 2805  
GS JET AIRCRAFT  
#TURBOPROP AIRCRAFT  
..AN-22 AIRCRAFT  
..AN-24 AIRCRAFT  
..ARGOSY MK-1 AIRCRAFT  
..BREGUET 941 AIRCRAFT  
..BREGUET 1150 AIRCRAFT  
..C-2 AIRCRAFT

| RT                        | % AIRCRAFT |
|---------------------------|------------|
| ..VISCOUNT AIRCRAFT       |            |
| ..YS-11 AIRCRAFT          |            |
| GENERAL AVIATION AIRCRAFT |            |
| % LOW WING AIRCRAFT       |            |
| PASSENGER AIRCRAFT        |            |
| % SUBSONIC AIRCRAFT       |            |
| TRANSPORT AIRCRAFT        |            |
| TURBOFAN AIRCRAFT         |            |

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IMPS
TURBINE PUMPS

MJET ENGINES
2801 2805
ENGINES
..AIR BREATHING ENGINES
..GAS TURBINE ENGINES
...JET ENGINES
....RAMJET ENGINES
....#TURBORAMJET ENGINES
....TURBOJET ENGINES
....#TURBORAMJET ENGINES
..INTERNAL COMBUSTION ENGINES
..GAS TURBINE ENGINES
...JET ENGINES

```

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ENCE
1202 1308 2003 3408
#TURBULENCE
..ATMOSPHERIC TURBULENCE
..CLEAR AIR TURBULENCE
..GUSTS
..LOW LEVEL TURBULENCE
..HOMOGENEOUS TURBULENCE
..ISOTROPIC TURBULENCE
..LOW TURBULENCE
..MAGNETOHYDRODYNAMIC TURBULENCE
..PLASMA TURBULENCE
..AERODYNAMIC DRAG
ATMOSPHERIC EFFECTS
BACKWASH
BOUNDARY LAYER CONTROL
BOUNDARY LAYER TRANSITION

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[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

VORTEX AVOIDANCE  
VORTEX BREAKDOWN  
VORTICES  
VORTICITY TRANSPORT HYPOTHESIS

TURBULENT HEAT TRANSFER

3303 3501  
GS TRANSMISSION  
.HEAT TRANSMISSION  
..HEAT TRANSFER  
..#TURBULENT HEAT TRANSFER  
RT AERODYNAMIC HEAT TRANSFER  
CONVECTIVE HEAT TRANSFER  
LAMINAR HEAT TRANSFER  
THERMOHYDRAULICS

TURBULENT JETS

1201 1202 1203  
RT FLUID AMPLIFIERS  
JET STREAMS (METEOROLOGY)  
% JETS

TURBULENT MIXING

0201 1201 1202 1203 3009  
GS MIXING  
#TURBULENT MIXING  
RT AGITATION  
LAMINAR MIXING  
MIXING LAYERS (FLUIDS)  
MIXING LENGTH FLOW THEORY  
RECIRCULATIVE FLUID FLOW  
TRAPPED VORTICES  
VORTICES

TURBULENT WAKES

0101 0201 1203 3501  
UF SWIRLING WAKES  
GS WAKES  
#TURBULENT WAKES  
..SLIPSTREAMS  
...PROPELLER SLIPSTREAMS  
RT AIRCRAFT WAKES  
LAMINAR WAKES  
TRAPPED VORTICES  
VORTEX ADVISORY SYSTEM  
VORTEX SHEETS  
VORTEX STREETS

TURING MACHINES

0801 0802 1504  
UF FINITE-STATE MACHINES  
RT AUTOMATA THEORY  
DIGITAL COMPUTERS  
% MACHINERY  
MATHEMATICAL LOGIC

SELF ORGANIZING SYSTEMS

TURKEY

1305  
GS NATIONS  
#TURKEY  
RT BLACK SEA  
EUROPE  
TURKISH SPACE PROGRAM

TURKEYS

0402  
GS ANIMALS  
.VERTEBRATES  
..BIRDS  
..#TURKEYS  
RT LIVESTOCK

TURKISH SPACE PROGRAM

3409  
GS PROGRAMS  
.SPACE PROGRAMS  
..EUROPEAN SPACE PROGRAMS  
..#TURKISH SPACE PROGRAM  
RT TURKEY

TURKMENISTAN

1305  
GS NATIONS  
#TURKMENISTAN  
RT ASIA

TURNAROUND (STS)

2311  
RT DOWNTIME  
FLIGHT TIME  
LAUNCH DATES  
SCHEDULES  
SEQUENCING  
SPACECRAFT MAINTENANCE  
TESTING TIME

TURNING FLIGHT

0201 1504 1704 3407  
UF BANKING FLIGHT  
GS #TURNING FLIGHT  
.MINOR CIRCLE TURNING FLIGHT  
RT AERODYNAMIC BALANCE  
AIRCRAFT MANEUVERS  
AIRCRAFT STABILITY  
CLIMBING FLIGHT  
% FLIGHT  
FLIGHT PATHS  
HORIZONTAL FLIGHT  
LATERAL OSCILLATION

LATERAL STABILITY

MANEUVERS  
MOMENTUM  
ROLL  
YAW

TURNSTILE ANTENNAS

0701 0705 0901  
GS ANTENNAS  
.OMNIDIRECTIONAL ANTENNAS  
.#TURNSTILE ANTENNAS  
ARRAYS  
.ANTENNA ARRAYS  
.#TURNSTILE ANTENNAS  
RT DIPOLE ANTENNAS  
% GRIDS  
WIRE GRID LENSES

TURPENTINE

1808  
GS SOLVENTS  
#TURPENTINE  
TERPENES  
#TURPENTINE  
RT PAINTS

% TURRET

3203 3401  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT GUN TURRETS  
TURRET LATHES

TURRET LATHES

1504  
GS TOOLS  
.MACHINE TOOLS  
..LATHES  
..#TURRET LATHES  
RT % TURRET

TURTLES

0402  
GS ANIMALS  
.VERTEBRATES  
..REPTILES  
..#TURTLES

TUTOR AIRCRAFT

USE CL-41 AIRCRAFT

TVC (CONTROL)

USE THRUST VECTOR CONTROL

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                                      |  |  |  |  |  |
|--------------------------------------|--|--|--|--|--|
| MATHEMATICAL MODELS                  |  |  |  |  |  |
| THREE DIMENSIONAL MODELS             |  |  |  |  |  |
| TWO FLUID MODELS                     |  |  |  |  |  |
| 1202 1204 2502                       |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| BOLTZMANN DISTRIBUTION               |  |  |  |  |  |
| LIQUID HELIUM                        |  |  |  |  |  |
| MAGNETOHYDRODYNAMIC FLOW             |  |  |  |  |  |
| MIXING LAYERS (FLUIDS)               |  |  |  |  |  |
| ROTATING PLASMAS                     |  |  |  |  |  |
| SHOCK WAVE PROPAGATION               |  |  |  |  |  |
| SUPERFLUIDITY                        |  |  |  |  |  |
| TWO PHASE FLOW                       |  |  |  |  |  |
| 1202 1203 2502 2603                  |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| FLUID FLOW                           |  |  |  |  |  |
| .MULTIPHASE FLOW                     |  |  |  |  |  |
| .#TWO PHASE FLOW                     |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| GAS FLOW                             |  |  |  |  |  |
| LAMINAR FLOW                         |  |  |  |  |  |
| LIQUID FLOW                          |  |  |  |  |  |
| PARTICLE IMAGE VELOCIMETRY           |  |  |  |  |  |
| % PRESSURE DROP                      |  |  |  |  |  |
| SINGLE-PHASE FLOW                    |  |  |  |  |  |
| SOLIDS FLOW                          |  |  |  |  |  |
| TURBULENT FLOW                       |  |  |  |  |  |
| TWO PHASE SYSTEMS                    |  |  |  |  |  |
| USE BINARY SYSTEMS (MATERIALS)       |  |  |  |  |  |
| TWO PHOTON COHERENT STATES           |  |  |  |  |  |
| USE SQUEEZED STATES (QUANTUM THEORY) |  |  |  |  |  |
| TWO REFLECTOR ANTENNAS               |  |  |  |  |  |
| 0901                                 |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| ANTENNAS                             |  |  |  |  |  |
| .DIRECTIONAL ANTENNAS                |  |  |  |  |  |
| .REFLECTOR ANTENNAS                  |  |  |  |  |  |
| .#TWO REFLECTOR ANTENNAS             |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| CASSEGRAIN ANTENNAS                  |  |  |  |  |  |
| RADIO ANTENNAS                       |  |  |  |  |  |
| REFLECTOMETERS                       |  |  |  |  |  |
| REFLECTORS                           |  |  |  |  |  |
| TWO STAGE PLASMA ENGINES             |  |  |  |  |  |
| 2501 2502 2808                       |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| PLASMA POWER SOURCES                 |  |  |  |  |  |
| .PLASMA ENGINES                      |  |  |  |  |  |
| .#TWO STAGE PLASMA ENGINES           |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| ELECTRIC PROPULSION                  |  |  |  |  |  |
| PLASMAS (PHYSICS)                    |  |  |  |  |  |
| TWO STAGE TURBINES                   |  |  |  |  |  |
| 1504 2801 2805                       |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| TURBOMACHINERY                       |  |  |  |  |  |
| TURBINES                             |  |  |  |  |  |
| .#TWO STAGE TURBINES                 |  |  |  |  |  |
| GAS TURBINE ENGINES                  |  |  |  |  |  |
| STEAM TURBINES                       |  |  |  |  |  |
| TWO-WAVELENGTH LASERS                |  |  |  |  |  |
| 1601                                 |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| STIMULATED EMISSION DEVICES          |  |  |  |  |  |
| .LASERS                              |  |  |  |  |  |
| .#TWO-WAVELENGTH LASERS              |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| COHERENT LIGHT                       |  |  |  |  |  |
| DYE LASERS                           |  |  |  |  |  |
| LASER OUTPUTS                        |  |  |  |  |  |
| MASERS                               |  |  |  |  |  |
| MOLECULAR OSCILLATORS                |  |  |  |  |  |
| QUANTUM AMPLIFIERS                   |  |  |  |  |  |
| STIMULATED EMISSION                  |  |  |  |  |  |
| TX-33-39 ENGINE                      |  |  |  |  |  |
| USE XM-33 ENGINE                     |  |  |  |  |  |
| TX-77 ENGINE                         |  |  |  |  |  |
| 2808                                 |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| ENGINES                              |  |  |  |  |  |
| .ROCKET ENGINES                      |  |  |  |  |  |
| .SOLID PROPELLANT ROCKET ENGINES     |  |  |  |  |  |
| .#TX-77 ENGINE                       |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| LANCE MISSILE                        |  |  |  |  |  |
| TX-354 ENGINE                        |  |  |  |  |  |
| 2806 2808 2809                       |  |  |  |  |  |
| UF                                   |  |  |  |  |  |
| CASTOR 2 ENGINE                      |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| ENGINES                              |  |  |  |  |  |
| .ROCKET ENGINES                      |  |  |  |  |  |
| .SOLID PROPELLANT ROCKET ENGINES     |  |  |  |  |  |
| .#TX-354 ENGINE                      |  |  |  |  |  |
| BOOSTER ROCKET ENGINES               |  |  |  |  |  |
| LITTLE JOE 2 LAUNCH VEHICLE          |  |  |  |  |  |
| RAM B LAUNCH VEHICLE                 |  |  |  |  |  |
| SCOUT LAUNCH VEHICLE                 |  |  |  |  |  |
| SUSTAINER ROCKET ENGINES             |  |  |  |  |  |
| TRAILBLAZER 2 REENTRY VEHICLE        |  |  |  |  |  |
| XM-33 ENGINE                         |  |  |  |  |  |
| TYCHO CRATER                         |  |  |  |  |  |
| 3005 3009 3409                       |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| CRATERS                              |  |  |  |  |  |
| .LUNAR CRATERS                       |  |  |  |  |  |
| .#TYCHO CRATER                       |  |  |  |  |  |
| RT                                   |  |  |  |  |  |
| METEORITE CRATERS                    |  |  |  |  |  |
| TYPE 2 BURSTS                        |  |  |  |  |  |
| 0705 2402 2902                       |  |  |  |  |  |
| GS                                   |  |  |  |  |  |
| BURSTS                               |  |  |  |  |  |
| .RADIO BURSTS                        |  |  |  |  |  |
| .SOLAR RADIO BURSTS                  |  |  |  |  |  |
| .#TYPE 2 BURSTS                      |  |  |  |  |  |
| ELECTROMAGNETIC RADIATION            |  |  |  |  |  |
| .RADIO WAVES                         |  |  |  |  |  |
| .EXTRATERRESTRIAL RADIO WAVES        |  |  |  |  |  |
| .#RADIO BURSTS                       |  |  |  |  |  |
| .SOLAR RADIO BURSTS                  |  |  |  |  |  |
| .#TYPE 2 BURSTS                      |  |  |  |  |  |
| .SOLAR RADIO EMISSION                |  |  |  |  |  |
| .SOLAR RADIO BURSTS                  |  |  |  |  |  |
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[illegible]

## NASA THESAURUS HIERARCHICAL UPDATE

|                                           |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| RT                                        | .#TYROSINE<br>ENZYME ACTIVITY<br>LIVER                                                                                                                                                                                                                       | LUNIK LUNAR PROBES<br>LUNIK 19 LUNAR PROBE<br>LUNIK 22 LUNAR PROBE<br>LUNKHOD LUNAR ROVING VEHICLES<br>MARS 1 SPACECRAFT<br>MARS 2 SPACECRAFT<br>MARS 3 SPACECRAFT<br>MARS 4 SPACECRAFT<br>MARS 5 SPACECRAFT<br>MARS 6 SPACECRAFT<br>MARS 7 SPACECRAFT<br>MIR SPACE STATION<br>MOLNIYA SATELLITES<br>PROTON SATELLITES<br>SALYUT SPACE STATION<br>SOYUZ SPACECRAFT<br>VEGA PROJECT<br>VENERA SATELLITES<br>VENERA 8 SATELLITE<br>VENERA 10 SATELLITE<br>VENERA 11 SATELLITE<br>VENERA 12 SATELLITE | UTILITY AIRCRAFT<br>#U-10 AIRCRAFT<br>V/STOL AIRCRAFT<br>.SHORT TAKEDOFF AIRCRAFT<br>.#U-10 AIRCRAFT<br>RT % AIRCRAFT |
| T2J AIRCRAFT<br>USE T-2 AIRCRAFT          |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       |
| T3J AIRCRAFT<br>USE T-39 AIRCRAFT         |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       |
| U BENDS<br>3203<br>GS                     | PIPES (TUBES)<br>#U BENDS<br>RT FITTINGS                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UARS (SATELLITE)<br>USE UPPER ATMOSPHERE RESEARCH<br>SATELLITE (UARS)                                                 |
| U SPIN SPACE<br>1902 2307 2403 2405<br>GS | ALGEBRA<br>.VECTOR SPACES<br>.#U SPIN SPACE<br>RT MATRICES (MATHEMATICS)<br>QUANTUM MECHANICS                                                                                                                                                                | UBV SPECTRA<br>2402 2903<br>GS SPECTRA<br>.RADIATION SPECTRA<br>.ELECTROMAGNETIC SPECTRA<br>.#UBV SPECTRA<br>RT COLOR-COLOR DIAGRAM                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                       |
| U TUBES<br>USE MANOMETERS                 |                                                                                                                                                                                                                                                              | UDIMET ALLOYS<br>1701 1704 2806 3305<br>GS ALLOYS<br>.HEAT RESISTANT ALLOYS<br>.#UDIMET ALLOYS<br>.#NICKEL ALLOYS<br>.#UDIMET ALLOYS                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                       |
| U.S.S.R.<br>1305 3403<br>UF               | SOVIET UNION<br>GS NATIONS<br>#U.S.S.R.<br>RT ASIA<br>BARENTS SEA<br>BLACK SEA<br>CAUCASUS MOUNTAINS (U.S.S.R.)<br>EUROPE<br>KURILE ISLANDS<br>MOSCOW<br>SEA OF OKHOTSK<br>SIBERIA                                                                           | UFO<br>USE UNIDENTIFIED FLYING OBJECTS<br>UGANDA<br>1305<br>GS NATIONS<br>#UGANDA<br>RT AFRICA                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                       |
| U.S.S.R. SPACE PROGRAM<br>3409 3009<br>GS | SPACE PROGRAMS<br>.EUROPEAN SPACE PROGRAMS<br>.#U.S.S.R. SPACE PROGRAM<br>APOLLO SOYUZ TEST PROJECT<br>BURAN SPACE SHUTTLE<br>INTERNATIONAL COOPERATION<br>INTERNATIONAL RELATIONS<br>INTERNATIONAL SATELLITE GEODESY<br>EXPERIMENT<br>LUNAR RETROREFLECTORS | UH-1 HELICOPTER<br>O206<br>UF<br>HU-1 HELICOPTER<br>IROQUOIS HELICOPTER<br>RH-2 HELICOPTER<br>YHU-1 HELICOPTER<br>YUH-1 HELICOPTER<br>BELL AIRCRAFT<br>#UH-1 HELICOPTER<br>UTILITY AIRCRAFT<br>#UH-1 HELICOPTER<br>V/STOL AIRCRAFT<br>.ROTARY WING AIRCRAFT<br>..HELICOPTERS<br>...MILITARY HELICOPTERS<br>...#UH-1 HELICOPTER<br>UH-60A HELICOPTER<br>UH-61A HELICOPTER                                                                                                                           |                                                                                                                       |
| RT                                        |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       |

[illegible]



|                                     |                                 |      |      |      |      |      |
|-------------------------------------|---------------------------------|------|------|------|------|------|
| 0705                                | 0710                            | 2309 | 2312 | 2402 |      |      |
| SN                                  | (300 TO 3000 MHZ)               |      |      |      |      |      |
| UF                                  | L BAND                          |      |      |      |      |      |
| S BAND                              |                                 |      |      |      |      |      |
| FREQUENCIES                         |                                 |      |      |      |      |      |
| .RADIO FREQUENCIES                  |                                 |      |      |      |      |      |
| .#ULTRAHIGH FREQUENCIES             |                                 |      |      |      |      |      |
| ...P BAND                           |                                 |      |      |      |      |      |
| RT                                  | DECIMETER WAVES                 |      |      |      |      |      |
| EISCAT RADAR SYSTEM (EUROPE)        |                                 |      |      |      |      |      |
| FLEET SATELLITE COMMUNICATION       |                                 |      |      |      |      |      |
| SYSTEM                              |                                 |      |      |      |      |      |
| LOW FREQUENCY BANDS                 |                                 |      |      |      |      |      |
| PASSIVE L-BAND RADIOMETERS          |                                 |      |      |      |      |      |
| PRAETERSONIC DEVICES                |                                 |      |      |      |      |      |
| UNIFIED S BAND                      |                                 |      |      |      |      |      |
| VERY HIGH FREQUENCY RADIO EQUIPMENT |                                 |      |      |      |      |      |
| ULTRAHIGH VACUUM                    |                                 |      |      |      |      |      |
| 1203                                | 1506                            |      |      |      |      |      |
| GS                                  | PRESSURE                        |      |      |      |      |      |
| .VACUUM                             |                                 |      |      |      |      |      |
| .#ULTRAHIGH VACUUM                  |                                 |      |      |      |      |      |
| RT                                  | HIGH VACUUM                     |      |      |      |      |      |
| LOW DENSITY RESEARCH                |                                 |      |      |      |      |      |
| RESIDUAL GAS                        |                                 |      |      |      |      |      |
| VACUUM APPARATUS                    |                                 |      |      |      |      |      |
| VACUUM TESTS                        |                                 |      |      |      |      |      |
| ULTRALIGHT AIRCRAFT                 |                                 |      |      |      |      |      |
| O102                                |                                 |      |      |      |      |      |
| RT %                                | AIRCRAFT                        |      |      |      |      |      |
| HANG GLIDERS                        |                                 |      |      |      |      |      |
| LIGHT AIRCRAFT                      |                                 |      |      |      |      |      |
| MAN POWERED AIRCRAFT                |                                 |      |      |      |      |      |
| %                                   | WINGED VEHICLES                 |      |      |      |      |      |
| ULTRALOW FREQUENCIES                |                                 |      |      |      |      |      |
| USE                                 | EXTREMELY LOW RADIO FREQUENCIES |      |      |      |      |      |
| ULTRALOW TEMPERATURE                |                                 |      |      |      |      |      |
| USE                                 | CRYOGENIC TEMPERATURE           |      |      |      |      |      |
| ULTRAPURE METALS                    |                                 |      |      |      |      |      |
| O602                                | 1703                            | 1704 |      |      |      |      |
| GS                                  | METALS                          |      |      |      |      |      |
| #ULTRAPURE METALS                   |                                 |      |      |      |      |      |
| RT                                  | CRYSTAL LATTICES                |      |      |      |      |      |
| IMPURITIES                          |                                 |      |      |      |      |      |
| PURIFICATION                        |                                 |      |      |      |      |      |
| PURITY                              |                                 |      |      |      |      |      |
| SINGLE CRYSTALS                     |                                 |      |      |      |      |      |
| SPACE PROCESSING                    |                                 |      |      |      |      |      |
| VAPOR DEPOSITION                    |                                 |      |      |      |      |      |
| ZONE MELTING                        |                                 |      |      |      |      |      |
| INSPECTION                          |                                 |      |      |      |      |      |
| NONDESTRUCTIVE TESTS                |                                 |      |      |      |      |      |
| QUALITY CONTROL                     |                                 |      |      |      |      |      |
| ULTRASONIC SCANNERS                 |                                 |      |      |      |      |      |
| ULTRASONIC GRINDING MACHINES        |                                 |      |      |      |      |      |
| USE                                 | ULTRASONIC MACHINING            |      |      |      |      |      |
| ULTRASONIC LIGHT MODULATION         |                                 |      |      |      |      |      |
| 1601                                | 2301                            | 2306 | 2312 |      |      |      |
| UF                                  | ULM (LIGHT MODULATION)          |      |      |      |      |      |
| GS                                  | MODULATION                      |      |      |      |      |      |
| .LIGHT MODULATION                   |                                 |      |      |      |      |      |
| .#ULTRASONIC LIGHT MODULATION       |                                 |      |      |      |      |      |
| RT                                  | Bragg Cells                     |      |      |      |      |      |
| ULTRASONICS                         |                                 |      |      |      |      |      |
| ULTRASONIC MACHINING                |                                 |      |      |      |      |      |
| 1504                                | 1704                            | 2301 | 2312 |      |      |      |
| UF                                  | ULTRASONIC GRINDING MACHINES    |      |      |      |      |      |
| GS                                  | MACHINING                       |      |      |      |      |      |
| #ULTRASONIC MACHINING               |                                 |      |      |      |      |      |
| RT                                  | ULTRASONICS                     |      |      |      |      |      |
| ULTRASONIC RADIATION                |                                 |      |      |      |      |      |
| O710                                | 2301                            | 2309 | 2312 | 2402 |      |      |
| UF                                  | ULTRASONIC WAVES                |      |      |      |      |      |
| GS                                  | ELASTIC WAVES                   |      |      |      |      |      |
| #ULTRASONIC RADIATION               |                                 |      |      |      |      |      |
| RT                                  | ACOUSTIC FREQUENCIES            |      |      |      |      |      |
| COHERENT ACOUSTIC RADIATION         |                                 |      |      |      |      |      |
| MAGNETOELECTRIC WAVES               |                                 |      |      |      |      |      |
| %                                   | RADIATION                       |      |      |      |      |      |
| SOUND WAVES                         |                                 |      |      |      |      |      |
| ULTRASONICS                         |                                 |      |      |      |      |      |
| UNDERWATER ACOUSTICS                |                                 |      |      |      |      |      |
| ULTRASONIC SCANNERS                 |                                 |      |      |      |      |      |
| O705                                | 0802                            | 2301 | 2311 | 2312 | 3407 |      |
| GS                                  | SCANNERS                        |      |      |      |      |      |
| #ULTRASONIC SCANNERS                |                                 |      |      |      |      |      |
| RT                                  | ACOUSTICS                       |      |      |      |      |      |
| IMAGING TECHNIQUES                  |                                 |      |      |      |      |      |
| MEASURING INSTRUMENTS               |                                 |      |      |      |      |      |
| SCANNING                            |                                 |      |      |      |      |      |
| ULTRASONIC FLAW DETECTION           |                                 |      |      |      |      |      |
| ULTRASONICS                         |                                 |      |      |      |      |      |
| ULTRASONIC SOLDERING                |                                 |      |      |      |      |      |
| 1504                                | 1507                            | 2301 | 3303 | 0902 | 1507 | 1704 |
| 3303                                |                                 |      |      |      |      |      |
| UF                                  | SONIC SOLDERING                 |      |      |      |      |      |
| GS                                  | SOLDERING                       |      |      |      |      |      |
| #ULTRASONIC SOLDERING               |                                 |      |      |      |      |      |
| RT                                  | BRAZING                         |      |      |      |      |      |



# NASA THESAURUS HIERARCHICAL UPDATE

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ULTRAVIOLET PHOTOMETRY
1406 2306 2402
GS IMAGERY
#ULTRAVIOLET PHOTOMETRY
OPTICAL MEASUREMENT
.PHOTOMETRY
.#ULTRAVIOLET PHOTOMETRY
PHOTOGRAPHY
#ULTRAVIOLET PHOTOMETRY
RT BLACK AND WHITE PHOTOGRAPHY

ULTRAVIOLET RADIATION
2401 2402 2404 2903
UF ULTRAVIOLET LIGHT
GS ELECTROMAGNETIC RADIATION
#ULTRAVIOLET RADIATION
..EXTREME ULTRAVIOLET RADIATION
...FAR ULTRAVIOLET RADIATION
...LYMAN ALPHA RADIATION
...LYMAN BETA RADIATION
...NEAR ULTRAVIOLET RADIATION
..ULTRAVIOLET EMISSION
BEAMS (RADIATION)
BLACK BODY RADIATION
CERENKOV RADIATION
COHERENT ELECTROMAGNETIC RADIATION
CORONAL HOLES
DAYGLOW
IUE
MICROCHANNELS
MONOCHROMATIC RADIATION
POLARIZED ELECTROMAGNETIC RADIATION
% RADIATION
SEYFERT GALAXIES
SOLAR RADIATION
STERILIZATION
SUNLIGHT
THERMAL RADIATION
ULTRAVIOLET DETECTORS
UMKEHR EFFECT

ULTRAVIOLET REFLECTION
2306 2309 2402
GS REFLECTION
#ULTRAVIOLET REFLECTION
RT INFRARED REFLECTION
RADIO ECHOES
REFLECTOMETERS
SPREAD REFLECTION

ULTRAVIOLET SPECTRA
1411 2306 2402 2903
GS SPECTRA
.RADIATION SPECTRA

..ELECTROMAGNETIC SPECTRA
..#ULTRAVIOLET SPECTRA
ABSORPTION SPECTRA
EMISSION SPECTRA
HERZBERG BANDS
LIGHT (VISIBLE RADIATION)
LINE SPECTRA
LYMAN SPECTRA
MOLECULAR SPECTRA
RADIO SPECTROSCOPY
SOLAR SPECTRA
STELLAR SPECTRA
ULTRAVIOLET DETECTORS
ULTRAVIOLET EMISSION

ULTRAVIOLET SPECTROGRAPHS
USE ULTRAVIOLET SPECTROMETERS

ULTRAVIOLET SPECTROMETERS
1404 1405 2306 2402 2903
UF ULTRAVIOLET SPECTROGRAPHS
GS MEASURING INSTRUMENTS
.OPTICAL MEASURING INSTRUMENTS
..PHOTOMETERS
..#ULTRAVIOLET SPECTROMETERS
....TOTAL OZONE MAPPING
.SPECTROMETER
.RADIATION MEASURING INSTRUMENTS
..ACTINOMETERS
...ULTRAVIOLET DETECTORS
...#ULTRAVIOLET SPECTROMETERS
....TOTAL OZONE MAPPING
.SPECTROMETER
..PHOTOMETERS
..#ULTRAVIOLET SPECTROMETERS
....TOTAL OZONE MAPPING
.SPECTROMETER
.SPECTROMETERS
.#ULTRAVIOLET SPECTROMETERS
...HIGH DISPERSION SPECTROGRAPHS
...TOTAL OZONE MAPPING SPECTROMETER
.OPTICAL EQUIPMENT
.OPTICAL MEASURING INSTRUMENTS
..PHOTOMETERS
..#ULTRAVIOLET SPECTROMETERS
....TOTAL OZONE MAPPING
.SPECTROMETER
EBERT SPECTROMETERS
SOLAR MAXIMUM MISSION
SOLAR SPECTROMETERS

RT

ULTRAVIOLET SPECTROPHOTOMETERS
1404 1411 2306 2402
GS SPECTROPHOTOMETERS
#ULTRAVIOLET SPECTROPHOTOMETERS
.OPTICAL MEASURING INSTRUMENTS
..PHOTOMETERS
..#ULTRAVIOLET SPECTROPHOTOMETERS
...SPECTROPHOTOMETERS
...#ULTRAVIOLET DETECTORS
...#ULTRAVIOLET SPECTROPHOTOMETERS
..PHOTOMETERS
..#ULTRAVIOLET SPECTROPHOTOMETERS
.OPTICAL EQUIPMENT
.OPTICAL MEASURING INSTRUMENTS
..PHOTOMETERS
..#ULTRAVIOLET SPECTROPHOTOMETERS
...SPECTROPHOTOMETERS
...#ULTRAVIOLET SPECTROPHOTOMETERS

ULTRAVIOLET SPECTROSCOPY
1404 1411 2306 2402 2903
GS SPECTROSCOPY
#ULTRAVIOLET SPECTROSCOPY
RT ABSORPTION SPECTROSCOPY
ASTRONOMICAL SPECTROSCOPY
MOLECULAR SPECTROSCOPY
OPTOGALVANIC SPECTROSCOPY
RADIO SPECTROSCOPY
SPECTROSCOPIC ANALYSIS
SPECTRUM ANALYSIS
VACUUM SPECTROSCOPY
X RAY SPECTROSCOPY

ULTRAVIOLET TELESCOPES
1412 3001 2903 3001
GS TELESCOPES
#ULTRAVIOLET TELESCOPES
..STARLAB
RT FAR ULTRAVIOLET RADIATION
SPACEBORNE ASTRONOMY
ULTRAVIOLET ASTRONOMY
X RAY ASTRONOMY

ULYSSES MISSION
3004
UF INTERNATIONAL SOLAR POLAR MISSION
GS SPACE MISSIONS
#ULYSSES MISSION
RT INERTIAL UPPER STAGE
MISSION PLANNING
% MISSIONS
SOLAR MAXIMUM MISSION
SOLAR PROBES
SUN

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UMBILICAL CONNECTORS  
O404 0507 0904 1104 1504  
GS CONNECTORS  
RT #UMBILICAL CONNECTORS  
BUNDLES  
EXTRAVEHICULAR ACTIVITY  
TETHERLINES

UMBILICAL TOWERS  
1102 1104  
GS TOWERS  
RT #UMBILICAL TOWERS  
GANTRY CRANES  
LAUNCHING PADS

UMBRAS  
2310 3002  
RT ECLIPSES  
PENUMBRAS  
SHADOWS

UMBRIEL  
1901 3001 3007 3008  
GS CELESTIAL BODIES  
NATURAL SATELLITES  
URANUS SATELLITES  
UMBRIEL  
RT URANUS (PLANET)

UMKEHR EFFECT  
2306 2402 2902  
RT % EFFECTS  
LIGHT SCATTERING  
OZONOSPHERE  
SUNLIGHT  
ULTRAVIOLET RADIATION

UMKLAPP PROCESS  
2401 2403 3407  
RT ELECTRON SCATTERING  
PHONON BEAMS  
PHONONS  
PHOTON-ELECTRON INTERACTION  
% PROCESSES

UNCAMBERED WINGS  
0101 0102 0103 0104  
GS AIRFOILS  
WINGS  
UNCAMBERED WINGS  
RING WINGS  
CAMBERED WINGS  
FIXED WINGS  
THIN WINGS  
TWISTED WINGS

UNCONSCIOUSNESS  
0401 0408  
GS #UNCONSCIOUSNESS  
BLACKOUT (PHYSIOLOGY)  
BLACKOUT PREVENTION  
NARCOSIS  
ANESTHESIA  
% COMA  
SYNCOPE

UNCONTROLLED REENTRY (SPACECRAFT)  
3107 3501  
GS ATMOSPHERIC ENTRY  
REENTRY  
HYPERSONIC REENTRY  
UNCONTROLLED REENTRY  
(SPACECRAFT)  
SPACECRAFT REENTRY  
UNCONTROLLED REENTRY  
(SPACECRAFT)  
AERODYNAMIC HEATING  
COSMOS 954 SATELLITE  
DESCENT  
FLIGHT PATHS  
PLASMA SHEATHS  
SPACECRAFT BREAKUP  
SPACECRAFT SURVIVABILITY

UNCOUPLED MODES  
0710 2402 2403  
GS MODES  
VIBRATION MODE  
UNCOUPLED MODES  
COUPLED MODES  
COUPLES  
MODES (STANDING WAVES)

UNDAMPED OSCILLATIONS  
0101 1001 1002 2308 2311  
GS OSCILLATIONS  
UNDAMPED OSCILLATIONS  
AIRFOIL OSCILLATIONS  
FLAPPING  
FLUTTER  
RESONANT VIBRATION  
STABLE OSCILLATIONS  
WING OSCILLATIONS

UNDER SURFACE BLOWING  
0101  
GS BLOWING  
UNDER SURFACE BLOWING  
AERODYNAMIC CHARACTERISTICS  
AIRCRAFT CONFIGURATIONS

UNDERGROUND ACOUSTICS  
1202  
RT ACOUSTIC SOUNDING  
EXPLORATION  
MINERALS  
STRATA

UNDERGROUND COMMUNICATION  
0702 0705 0710  
GS COMMUNICATING  
UNDERGROUND COMMUNICATION  
RT RADIO COMMUNICATION

UNDERGROUND EXPLOSIONS  
1106 1108 3302 3401  
GS EXPLOSIONS  
UNDERGROUND EXPLOSIONS  
RT CHEMICAL EXPLOSIONS  
GAS EXPLOSIONS  
MINES (EXCAVATIONS)  
NUCLEAR EXPLOSIONS  
SEISMIC WAVES  
THERMONUCLEAR EXPLOSIONS

UNDERGROUND RADIO ANTENNA GRID (NAVY)  
USE SEAFARER PROJECT

UNDERGROUND STORAGE  
1102 1103  
RT DECOMMISSIONING  
MINES (EXCAVATIONS)  
MISSILE STORAGE  
PROPELLANT STORAGE  
% STORAGE  
STORAGE TANKS

UNDERGROUND STRUCTURES  
1102

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                      |                                                                                                                                                                                  |                                                                                                                                                                                            |    |                                                                                                                                                                                                                                                        |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                   | CAVES<br>EXCAVATION<br>FOUNDATIONS<br>MINES (EXCAVATIONS)<br>MINING<br>PASSAGEWAYS<br>TUNNELING (EXCAVATION)                                                                     | SHOCK WAVES<br>SONAR<br>SONOBUOYS<br>SOUND TRANSDUCERS                                                                                                                                     | RT | ...SUBMARINE PROPULSION<br>AEROQUATIC VEHICLES<br>CHEMICAL PROPULSION<br>ELECTRIC PROPULSION<br>NUCLEAR PROPULSION<br>PROPELLER DRIVE<br>TORPEDO ENGINES                                                                                               |
| UNDERGROUND TRANSMISSION LINES<br>O904               |                                                                                                                                                                                  | UNDERWATER ENGINEERING<br>1310 2311 3404<br>RT BREAKWATERS<br>% ENGINEERING<br>SUBMERGED BODIES                                                                                            |    | UNDERWATER RESEARCH LABORATORIES<br>1204 3401<br>GS                                                                                                                                                                                                    |
| GS                                                   | TRANSMISSION LINES<br>#UNDERGROUND TRANSMISSION LINES                                                                                                                            | UNDERWATER EXPLOSIONS<br>3302 3401<br>GS EXPLOSIONS<br>#UNDERWATER EXPLOSIONS                                                                                                              |    | LABORATORIES<br>#UNDERWATER RESEARCH LABORATORIES<br>RESEARCH VEHICLES<br>#UNDERWATER RESEARCH LABORATORIES<br>SUBMERGED BODIES<br>#UNDERWATER RESEARCH LABORATORIES<br>WATER VEHICLES<br>- UNDERWATER VEHICLES<br>- #UNDERWATER RESEARCH LABORATORIES |
| RT                                                   | CIRCUITS<br>ELECTRIC POWER TRANSMISSION<br>% LINES<br>% NETWORKS<br>POWER LINES                                                                                                  | RT ANTISUBMARINE WARFARE<br>CHEMICAL EXPLOSIONS<br>HYDROBALLISTICS<br>NUCLEAR EXPLOSIONS<br>THERMONUCLEAR EXPLOSIONS                                                                       | RT | BATHYMETERS<br>OCEAN DATA ACQUISITIONS SYSTEMS<br>OCEANOGRAPHY                                                                                                                                                                                         |
| UNDERWATER ACOUSTICS<br>2301                         |                                                                                                                                                                                  | UNDERWATER OPTICS<br>1407 2306 2310<br>RT DIFFRACTION PATTERNS<br>DIFFRACTION PROPAGATION<br>GEOMETRICAL OPTICS<br>OPACITY<br>OPTICAL DENSITY<br>OPTICAL PATHS<br>% OPTICS<br>REFRACTIVITY |    | UNDERWATER RESOURCES<br>1306<br>GS                                                                                                                                                                                                                     |
| UF                                                   | HYDROACOUSTICS<br>UNDERWATER SOUND<br>ACOUSTICS                                                                                                                                  |                                                                                                                                                                                            | RT | RESOURCES<br>- EARTH RESOURCES<br>- #UNDERWATER RESOURCES<br>CRUDE OIL<br>DREDGING<br>FOSSIL FUELS<br>GEOTHERMAL RESOURCES<br>MARINE RESOURCES<br>MINERAL DEPOSITS<br>OCEAN BOTTOM<br>OCEANOGRAPHY<br>OIL EXPLORATION<br>SEA WATER<br>WATER RESOURCES  |
| GS                                                   | #UNDERWATER ACOUSTICS<br>ACOUSTIC SCATTERING<br>COHERENT ACOUSTIC RADIATION<br>DEEP SCATTERING LAYERS<br>ECHO SOUNDING<br>ELASTIC WAVES<br>LOFAR<br>NOISE (SOUND)<br>SHOCK WAVES |                                                                                                                                                                                            |    | UNDERWATER SOUND<br>USE UNDERWATER ACOUSTICS                                                                                                                                                                                                           |
| RT                                                   | SONAR<br>SONOBUOYS<br>SOUND FIXING AND RANGING<br>SOUND TRANSDUCERS<br>THERMOCLINES<br>ULTRASONIC RADIATION<br>ULTRASONIC WAVE TRANSDUCERS                                       | UNDERWATER PHOTOGRAPHY<br>1310 1407<br>GS PHOTOGRAPHY<br>#UNDERWATER PHOTOGRAPHY<br>RT CAMERAS<br>COLOR PHOTOGRAPHY<br>SEA WATER<br>SEAS<br>SUBMERGED BODIES                               |    | UNDERWATER STRUCTURES<br>1310 3404<br>RT BREAKWATERS<br>STRUCTURAL DESIGN<br>SUBMERGED BODIES                                                                                                                                                          |
| UNDERWATER BREATHING APPARATUS<br>O501               |                                                                                                                                                                                  | UNDERWATER PHYSIOLOGY<br>O408<br>GS PHYSIOLOGY<br>#UNDERWATER PHYSIOLOGY<br>RT DIVING (UNDERWATER)<br>% SCIENCE<br>STRESS (PHYSIOLOGY)                                                     |    | UNDERWATER TESTS<br>O404 0501 0504 1106 1108<br>GS ENVIRONMENTAL TESTS<br>#UNDERWATER TESTS<br>- NEUTRAL BUOYANCY SIMULATION<br>CORROSION TESTS                                                                                                        |
| GS                                                   | BREATHING APPARATUS<br>#UNDERWATER BREATHING APPARATUS<br>ARGON-OXYGEN ATMOSPHERES<br>BIOENGINEERING<br>HELIUM-OXYGEN ATMOSPHERES<br>LIFE SUPPORT SYSTEMS                        |                                                                                                                                                                                            |    |                                                                                                                                                                                                                                                        |
| RT                                                   |                                                                                                                                                                                  |                                                                                                                                                                                            |    |                                                                                                                                                                                                                                                        |
| UNDERWATER COMMUNICATION<br>O701 0702 1310 1413 2312 |                                                                                                                                                                                  | UNDERWATER PROPULSION<br>1202 3401<br>GS PROPULSION<br>- MARINE PROPULSION<br>- #UNDERWATER PROPULSION                                                                                     |    |                                                                                                                                                                                                                                                        |
| GS                                                   | TELECOMMUNICATION<br>- COMMUNICATION<br>- #UNDERWATER COMMUNICATION<br>SEAFARER PROJECT                                                                                          |                                                                                                                                                                                            |    |                                                                                                                                                                                                                                                        |
| RT                                                   |                                                                                                                                                                                  |                                                                                                                                                                                            |    |                                                                                                                                                                                                                                                        |

|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                              |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| DIVING (UNDERWATER)<br>WATER IMMERSION                                                               | ELECTROMAGNETIC INTERACTIONS<br>ELECTROMAGNETISM<br>GRAVITATION THEORY<br>GRAVITATIONAL FIELDS<br>PARTICLE THEORY<br>PLASMA PHYSICS<br>RELATIVITY<br>STRING THEORY<br>SUPERGRAVITY<br>SUPERSYMMETRY<br>THEORETICAL PHYSICS                                                                                                                            | % STRUCTURES                                                                                                                 |
| UNDERWATER TO SURFACE MISSILES<br>3101<br>GS                                                         | UNIFIED S BAND<br>0705<br>RT                                                                                                                                                                                                                                                                                                                          | UNIONIZATION<br>3402 3404 3406<br>RT                                                                                         |
| MISSILES<br>#UNDERWATER TO SURFACE MISSILES<br>..SUBROC MISSILE<br>RT % SURFACES                     | APOLLO SPACECRAFT<br>CARRIER FREQUENCIES<br>CIRCUMLUNAR COMMUNICATION<br>COMMUNICATION EQUIPMENT<br>DIFFERENTIAL PULSE CODE MODULATION<br>MANNED SPACE FLIGHT NETWORK<br>PULSE CODE MODULATION<br>SATELLITE COMMUNICATION<br>SPACECRAFT COMMUNICATION<br>SPACECRAFT TRACKING<br>SUPERHIGH FREQUENCIES<br>ULTRAHIGH FREQUENCIES                        | UNIONIZATION<br>3402 3404 3406<br>RT<br>FEDERATIONS<br>ORGANIZING<br>PERSONNEL<br>% UNIONS                                   |
| UNDERWATER TRAJECTORIES<br>2308 3006 3101<br>GS                                                      | TRAJECTORIES<br>#UNDERWATER TRAJECTORIES<br>RT                                                                                                                                                                                                                                                                                                        | % UNIONS<br>1504 3404 3406<br>SN<br>(USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)       |
| ANTI-SUBMARINE WARFARE<br>HYDROBALLISTICS<br>MISSILE TRAJECTORIES<br>SUBROC MISSILE<br>TORPEDOES     | UNIFORM FLOW<br>0101 1202 1203 3304<br>GS                                                                                                                                                                                                                                                                                                             | BOOLEAN ALGEBRA<br>UNIONIZATION<br>UNIONS (CONNECTORS)                                                                       |
| UNDERWATER VEHICLES<br>1204 3401<br>GS                                                               | BOATS<br>% MILITARY VEHICLES<br>RESEARCH VEHICLES<br>SHIPS<br>SUBMERGED BODIES<br>SURFACE VEHICLES<br>% VEHICLES                                                                                                                                                                                                                                      | CONNECTORS<br>#UNIONS (CONNECTORS)<br>RT<br>COUPLINGS<br>FASTENERS<br>FITTINGS<br>JOINTS (JUNCTIONS)<br>LINKAGES<br>% UNIONS |
| RT                                                                                                   | UNIFORM FLOW<br>0101 1202 1203 3304<br>GS                                                                                                                                                                                                                                                                                                             | UNIPHASE FLOW<br>USE SINGLE-PHASE FLOW                                                                                       |
| UNIDENTIFIED FLYING OBJECTS<br>0205 3110 3009<br>UF                                                  | ..BLASIUS FLOW<br>AERODYNAMICS<br>FLUID DYNAMICS<br>GAS FLOW<br>HEAT TRANSMISSION<br>LAMINAR FLOW<br>LIQUID FLOW<br>MASS FLOW<br>MULTIPHASE FLOW<br>NONUNIFORM FLOW<br>PIPE FLOW<br>PRESSURE GRADIENTS<br>QUASI-STEADY STATES<br>SINGLE-PHASE FLOW<br>SOLIDS FLOW<br>STEADY FLOW<br>STEAM FLOW<br>SUBCRITICAL FLOW<br>TURBULENT FLOW<br>UNSTEADY FLOW | UNIPOLAR TRANSISTORS<br>USE FIELD EFFECT TRANSISTORS                                                                         |
| RT % AIRCRAFT<br>EXTRATERRESTRIAL INTELLIGENCE<br>% SPACECRAFT<br>% VEHICLES                         | RT                                                                                                                                                                                                                                                                                                                                                    | UNIQUENESS<br>1902 3408<br>RT                                                                                                |
| UNIFIED FIELD THEORY<br>2311<br>GS                                                                   | UNIMOLECULAR STRUCTURES<br>0603 2404<br>RT                                                                                                                                                                                                                                                                                                            | ABNORMALITIES<br>SINGULARITY (MATHEMATICS)                                                                                   |
| FIELD THEORY (PHYSICS)<br>GRAND UNIFIED THEORY<br>#UNIFIED FIELD THEORY<br>RT ELECTROMAGNETIC FIELDS | MOLECULAR STRUCTURE                                                                                                                                                                                                                                                                                                                                   | UNIQUENESS THEOREM<br>1902 3501<br>GS                                                                                        |
|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                       | THEOREMS<br>#UNIQUENESS THEOREM<br>RT                                                                                        |
|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                       | ALGEBRA<br>COMPLEX VARIABLES<br>GEOMETRY<br>NUMBER THEORY<br>PROBABILITY THEORY<br>REAL VARIABLES                            |
|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                       | UNITED ARAB EMIRATES<br>1305<br>GS                                                                                           |
|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                       | NATIONS<br>#UNITED ARAB EMIRATES                                                                                             |

## NASA THESAURUS HIERARCHICAL UPDATE

|                                   |                           |                                          |                  |                                |
|-----------------------------------|---------------------------|------------------------------------------|------------------|--------------------------------|
| UNITED KINGDOM                    |                           | ..MARYLAND                               | RT               | .INTERNATIONAL SYSTEM OF UNITS |
| 1305                              |                           | ..MASSACHUSETTS                          |                  | CONVERSION TABLES              |
| UF                                | GREAT BRITAIN             | ..MICHIGAN                               |                  | DIMENSIONAL ANALYSIS           |
| GS                                | NATIONS                   | ..MINNESOTA                              |                  | DIMENSIONS                     |
|                                   | #UNITED KINGDOM           | ..MISSISSIPPI                            | %                | MEASUREMENT                    |
|                                   | ..ENGLAND                 | ..MISSOURI                               | METRICATION      | METROLOGY                      |
|                                   | ..GIBRALTAR               | ..MONTANA                                | MONTH            | MONTH                          |
|                                   | ..NORTHERN IRELAND        | ..NEBRASKA                               | PARAMETERIZATION | SIDEREAL TIME                  |
|                                   | ..SCOTLAND                | ..NEVADA                                 | SYMBOLS          | TIME                           |
| RT                                | ..WALES                   | ..NEW HAMPSHIRE                          |                  |                                |
|                                   | ENGLISH CHANNEL           | ..NEW JERSEY                             |                  |                                |
|                                   | EUROPE                    | ..NEW MEXICO                             |                  |                                |
|                                   | UK SPACE PROGRAM          | ..NEW YORK                               |                  |                                |
|                                   |                           | ..NORTH CAROLINA                         | UNITY            |                                |
| UNITED KINGDOM SATELLITES         |                           | ..NORTH DAKOTA                           | 3408             |                                |
| USE UK SATELLITES                 |                           | ..OHIO                                   | RT               | HOMOGENEITY                    |
|                                   |                           | ..OKLAHOMA                               |                  | STABILITY                      |
|                                   |                           | ..OREGON                                 |                  |                                |
| UNITED NATIONS                    |                           | ..PENNSYLVANIA                           | UNIVAC           | COMPUTERS                      |
| 3403                              | COMMUNITIES               | ..RHODE ISLAND                           | O801             |                                |
| RT                                | DEVELOPING NATIONS        | ..SOUTH CAROLINA                         | GS               | DATA PROCESSING EQUIPMENT      |
| FEDERATIONS                       | INTERNATIONAL COOPERATION | ..SOUTH DAKOTA                           |                  | .COMPUTERS                     |
| INTERNATIONAL LAW                 |                           | ..TENNESSEE                              |                  | ..#UNIVAC COMPUTERS            |
| NATIONS                           |                           | ..TEXAS                                  |                  | ..UNIVAC LARC COMPUTER         |
| ORGANIZATIONS                     |                           | ..UTAH                                   |                  | ..UNIVAC 80 COMPUTER           |
| POLITICS                          |                           | ..VERMONT                                |                  | ..UNIVAC 418 COMPUTER          |
| SEA LAW                           |                           | ..VIRGINIA                               |                  | ..UNIVAC 490 COMPUTER          |
| WORLD METEOROLOGICAL ORGANIZATION |                           | ..WASHINGTON                             |                  | ..UNIVAC 494 COMPUTER          |
|                                   |                           | ..WEST VIRGINIA                          |                  | ..UNIVAC 1100 SERIES COMPUTERS |
|                                   |                           | ..WISCONSIN                              |                  | ...UNIVAC 1105 COMPUTER        |
|                                   |                           | ..WYOMING                                |                  | ...UNIVAC 1106 COMPUTER        |
| UNITED STATES                     |                           | ALEUTIAN ISLANDS (US)                    |                  | ...UNIVAC 1107 COMPUTER        |
| 1305                              | USA (UNITED STATES)       | CASCADE RANGE (CA-OR-WA)                 |                  | ...UNIVAC 1108 COMPUTER        |
| UF                                | NATIONS                   | CENTRAL ATLANTIC REGION (US)             |                  | ...UNIVAC 1110 COMPUTER        |
| GS                                | #UNITED STATES            | DISTRICT OF COLUMBIA                     | RT               | ..UNIVAC 1230 COMPUTER         |
|                                   | ..ALABAMA                 | GREAT LAKES (NORTH AMERICA)              |                  | DIGITAL COMPUTERS              |
|                                   | ..ALASKA                  | GREAT PLAINS CORRIDOR (NORTH AMERICA)    | UNIVAC           | LARC COMPUTER                  |
|                                   | ..ARIZONA                 | GUAM                                     | O801             |                                |
|                                   | ..ARKANSAS                | INTERNATIONAL FIELD YEAR FOR GREAT LAKES | GS               | DATA PROCESSING EQUIPMENT      |
|                                   | ..CALIFORNIA              | INTERNATIONAL HYDROLOGICAL DECADE        |                  | .COMPUTERS                     |
|                                   | ..COLORADO                | MISSOURI RIVER (US)                      |                  | ..DIGITAL COMPUTERS            |
|                                   | ..CONNECTICUT             | NEW ENGLAND (US)                         |                  | ..#UNIVAC LARC COMPUTER        |
|                                   | ..DELAWARE                | NORTH AMERICA                            |                  | ..UNIVAC COMPUTERS             |
|                                   | ..FLORIDA                 | PACIFIC NORTHWEST (US)                   |                  | ..#UNIVAC LARC COMPUTER        |
|                                   | ..GEORGIA                 | PANAMA CANAL ZONE                        | UNIVAC           | 80 COMPUTER                    |
|                                   | ..HAWAII                  | PUERTO RICO                              | O801             |                                |
|                                   | ..IDAHO                   | ROCKY MOUNTAINS (NORTH AMERICA)          | GS               | DATA PROCESSING EQUIPMENT      |
|                                   | ..ILLINOIS                | SOUTHERN CALIFORNIA                      |                  | .COMPUTERS                     |
|                                   | ..INDIANA                 | VIRGIN ISLANDS                           |                  | ..DIGITAL COMPUTERS            |
|                                   | ..IOWA                    |                                          |                  | ..#UNIVAC 80 COMPUTER          |
|                                   | ..KANSAS                  |                                          |                  | ..UNIVAC COMPUTERS             |
|                                   | ..KENTUCKY                |                                          |                  | ..#UNIVAC 80 COMPUTER          |
|                                   | ..LOUISIANA               |                                          |                  |                                |
|                                   | ..MAINE                   |                                          |                  |                                |
|                                   |                           | UNITS OF MEASUREMENT                     |                  |                                |
|                                   |                           | 1406                                     |                  |                                |
|                                   |                           | GS #UNITS OF MEASUREMENT                 |                  |                                |

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

LOADING OPERATIONS  
MATERIALS HANDLING  
RELEASING  
REMOVAL  
SPREADING

UNLOADING WAVES

0710 3203

GS ELASTIC WAVES

#UNLOADING WAVES

UNMANNED SPACECRAFT

3101 3107 3110

GS #UNMANNED SPACECRAFT

.ECHO 2 SATELLITE

.HEAD 1

.HEAD 2

.HEAD 3

.HOTOL LAUNCH VEHICLE

.PIONEER VENUS SPACECRAFT

..PIONEER VENUS 1 SPACECRAFT

..PIONEER VENUS 2 SPACECRAFT

...PIONEER VENUS 2 TRANSPORTER BUS

.SPACE PROBES

...EXPLORER 18 SATELLITE

...GIOTTO MISSION

...JUPITER PROBES

...GALILEO PROBE

...GALILEO SPACECRAFT

...LUNAR PROBES

...LUNIK LUNAR PROBES

....LUNIK 2 LUNAR PROBE

....LUNIK 3 LUNAR PROBE

....LUNIK 9 LUNAR PROBE

....LUNIK 10 LUNAR PROBE

....LUNIK 11 LUNAR PROBE

....LUNIK 12 LUNAR PROBE

....LUNIK 13 LUNAR PROBE

....LUNIK 14 LUNAR PROBE

....LUNIK 16 LUNAR PROBE

....LUNIK 17 LUNAR PROBE

....LUNIK 19 LUNAR PROBE

....LUNIK 20 LUNAR PROBE

....LUNIK 22 LUNAR PROBE

...RANGER LUNAR PROBES

....RANGER LUNAR LANDING

....RANGER 1 LUNAR PROBE

....RANGER 2 LUNAR PROBE

....RANGER 3 LUNAR PROBE

....RANGER 4 LUNAR PROBE

....RANGER 5 LUNAR PROBE

....RANGER 6 LUNAR PROBE

....RANGER 7 LUNAR PROBE

....RANGER 8 LUNAR PROBE

....RANGER 9 LUNAR PROBE

...SURVEYOR LUNAR PROBES

....SURVEYOR 1 LUNAR PROBE

....SURVEYOR 2 LUNAR PROBE

....SURVEYOR 3 LUNAR PROBE

....SURVEYOR 4 LUNAR PROBE

....SURVEYOR 5 LUNAR PROBE

....SURVEYOR 6 LUNAR PROBE

....SURVEYOR 7 LUNAR PROBE

..MARINER SPACE PROBES

...MARINER R 2 SPACE PROBE

....MARINER 1 SPACE PROBE

....MARINER 2 SPACE PROBE

....MARINER 3 SPACE PROBE

....MARINER 4 SPACE PROBE

....MARINER 5 SPACE PROBE

....MARINER 6 SPACE PROBE

....MARINER 7 SPACE PROBE

....MARINER 8 SPACE PROBE

....MARINER 9 SPACE PROBE

....MARINER 10 SPACE PROBE

....MARINER 11 SPACE PROBE

..MARINER SPACECRAFT

...MARINER C SPACECRAFT

...MARINER VENUS 67 SPACECRAFT

..MARS PROBES

...ADVANCED RECONN ELECTRIC

SPACECRAFT

...MARINER 3 SPACE PROBE

...MARINER 4 SPACE PROBE

...MARINER 6 SPACE PROBE

...MARINER 7 SPACE PROBE

...MARINER 8 SPACE PROBE

...MARINER 9 SPACE PROBE

...MARS OBSERVER

...MARS 1 SPACECRAFT

...MARS 2 SPACECRAFT

...MARS 3 SPACECRAFT

...MARS 4 SPACECRAFT

...MARS 5 SPACECRAFT

...MARS 6 SPACECRAFT

...MARS 7 SPACECRAFT

...VIKING SPACECRAFT

...VIKING LANDER SPACECRAFT

....VIKING LANDER 1

....VIKING LANDER 2

....VIKING ORBITER SPACECRAFT

....VIKING ORBITER 1

....VIKING ORBITER 2

....VIKING ORBITER 1975

....VIKING 1 SPACECRAFT

....VIKING LANDER 1

....VIKING ORBITER 1

....VIKING 2 SPACECRAFT

....VIKING LANDER 2

.....VIKING ORBITER 2

...ZOND 2 SPACE PROBE

...PIONEER SPACE PROBES

....PIONEER VENUS 2 ENTRY PROBES

....PIONEER VENUS 2 NIGHT PROBE

....PIONEER VENUS 2 SOUNDER PROBE

...PIONEER 1 SPACE PROBE

...PIONEER 2 SPACE PROBE

...PIONEER 3 SPACE PROBE

...PIONEER 4 SPACE PROBE

...PIONEER 5 SPACE PROBE

...PIONEER 6 SPACE PROBE

...PIONEER 7 SPACE PROBE

...PIONEER 8 SPACE PROBE

...PIONEER 9 SPACE PROBE

...PIONEER 10 SPACE PROBE

...PIONEER 11 SPACE PROBE

..SOLAR PROBES

...HELIOS A

...HELIOS B

...HELIOS 1

...HELIOS 2

...STARPROBE SPACECRAFT

...SUNBLAZER SPACE PROBE

..VENUS PROBES

...MAGELLAN SPACECRAFT (NASA)

...MARINER 1 SPACE PROBE

...MARINER 2 SPACE PROBE

...MARINER 5 SPACE PROBE

...MARINER 10 SPACE PROBE

...VENERA SATELLITES

....VENERA 2 SATELLITE

....VENERA 3 SATELLITE

....VENERA 4 SATELLITE

....VENERA 5 SATELLITE

....VENERA 6 SATELLITE

....VENERA 7 SATELLITE

....VENERA 8 SATELLITE

....VENERA 9 SATELLITE

....VENERA 10 SATELLITE

....VENERA 11 SATELLITE

....VENERA 12 SATELLITE

...ZOND 1 SPACE PROBE

...ZOND 3 SPACE PROBE

...ZOND 4 SPACE PROBE

...ZOND 5 SPACE PROBE

...ZOND 6 SPACE PROBE

...ZOND 7 SPACE PROBE

...ZOND 8 SPACE PROBE

..VOYAGER 1 SPACECRAFT

..VOYAGER 2 SPACECRAFT

..TECHNOLOGY FEASIBILITY SPACECRAFT

..ZOND SPACE PROBES

...ZOND 1 SPACE PROBE

...ZOND 2 SPACE PROBE

...ZOND 3 SPACE PROBE

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|    |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                    |                                                                                                                                                                                                                      |                                            |                                                                                                                                                                                                                                                                                                                                            |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT | .....F 2 REGION<br>..EXOSPHERE<br>..THERMOSPHERE<br>...TURBOPAUSE<br>ACOUSTIC SOUNDING<br>AERONDMY<br>CHEMOSPHERE<br>FIELD ALIGNED CURRENTS<br>HETEROSPHERE<br>HIGH ALTITUDE<br>HOMOSPHERE<br>METEOR TRAILS<br>METEOROLOGICAL BALLOONS<br>MIDDLE ATMOSPHERE<br>OZONOSPHERE<br>PLASMASPHERE<br>PROTON PRECIPITATION<br>RADIATION BELTS<br>SATELLITE ATMOSPHERES<br>UPPER ATMOSPHERE RESEARCH<br>SATELLITE (UARS) | GS<br>RT                                                                                                                                                                                           | BLOWING<br>#UPPER SURFACE BLOWING<br>AERODYNAMIC CHARACTERISTICS<br>AIRCRAFT CONFIGURATIONS<br>CIRCULATION CONTROL AIRFOILS<br>LIFT<br>% SURFACES<br>UNDER SURFACE BLOWING                                           | UPWELLING WATER<br>1310<br>UF<br>RT        | UPWELLING<br>ATMOSPHERIC CIRCULATION<br>COASTS<br>OCEAN CURRENTS<br>WIND (METEOROLOGY)<br>WIND DIRECTION                                                                                                                                                                                                                                   |
|    | UPPER SURFACE BLOWN FLAPS<br>O104<br>GS                                                                                                                                                                                                                                                                                                                                                                         | GS                                                                                                                                                                                                 | AIRFOILS<br>.FLAPS (CONTROL SURFACES)<br>..EXTERNALLY BLOWN FLAPS<br>..#UPPER SURFACE BLOWN FLAPS<br>CONTROL SURFACES<br>.FLAPS (CONTROL SURFACES)<br>..EXTERNALLY BLOWN FLAPS<br>..#UPPER SURFACE BLOWN FLAPS<br>RT | UPWIND SCHEMES (MATHEMATICS)<br>1902<br>GS | ANALYSIS (MATHEMATICS)<br>..NUMERICAL ANALYSIS<br>..APPROXIMATION<br>..#UPWIND SCHEMES (MATHEMATICS)<br>COMPUTATIONAL FLUID DYNAMICS<br>EULER EQUATIONS OF MOTION<br>FINITE DIFFERENCE THEORY                                                                                                                                              |
|    | UPPER ATMOSPHERE RESEARCH SATELLITE (UARS)<br>3107<br>UF<br>GS                                                                                                                                                                                                                                                                                                                                                  | UPPER VOLTA<br>USE BURKINA<br>UPSETTING<br>O410 1704<br>RT                                                                                                                                         | BOUNDARY LAYER CONTROL<br>LIFT AUGMENTATION<br>LIFT DEVICES<br>% SURFACES                                                                                                                                            | URACIL<br>O403<br>GS                       | BASES (CHEMICAL)<br>#URACIL<br>NITROGEN COMPOUNDS<br>#URACIL<br>ORGANIC COMPOUNDS<br>.CYCLIC COMPOUNDS<br>..HETEROCYCLIC COMPOUNDS<br>...PYRIMIDINES<br>...#URACIL<br>ALLOXAN<br>URIDYLIC ACID                                                                                                                                             |
|    | UPPER IONOSPHERE<br>1302 2003 3009<br>GS                                                                                                                                                                                                                                                                                                                                                                        | FORMING TECHNIQUES<br>HOT ISOSTATIC PRESSING<br>HOT PRESSING<br>HOT WORKING<br>PRESSING (FORMING)<br>STAMPING<br>UPSTREAM<br>2003<br>RT                                                            | COLD PRESSING<br>COLD WORKING                                                                                                                                                                                        | URANIUM<br>O603<br>GS                      | 1703 2406<br>CHEMICAL ELEMENTS<br>.ACTINIDE SERIES<br>#URANIUM<br>...URANIUM ISOTOPES<br>...URANIUM 232<br>...URANIUM 233<br>...URANIUM 234<br>...URANIUM 235<br>...URANIUM 238<br>METALS<br>.ACTINIDE SERIES<br>#URANIUM<br>...URANIUM ISOTOPES<br>...URANIUM 232<br>...URANIUM 233<br>...URANIUM 234<br>...URANIUM 235<br>...URANIUM 238 |
| RT | UPPER STAGE ROCKET ENGINES<br>2801<br>GS                                                                                                                                                                                                                                                                                                                                                                        | ENGINEERING<br>ROCKET ENGINES<br>..UPPER STAGE ROCKET ENGINES<br>INERTIAL UPPER STAGE<br>MULTISTAGE ROCKET VEHICLES<br>SPACECRAFT CONFIGURATIONS<br>SPINNING SOLID UPPER STAGE<br>STAGE SEPARATION | AIR CURRENTS<br>WATER CURRENTS<br>WIND DIRECTION                                                                                                                                                                     |                                            |                                                                                                                                                                                                                                                                                                                                            |
|    | UPPER SURFACE BLOWING<br>O101                                                                                                                                                                                                                                                                                                                                                                                   | UPWASH<br>O101 1203 3501<br>RT                                                                                                                                                                     | DOWNWASH<br>DRAFT<br>INTERFERENCE DRAG<br>INTERFERENCE LIFT                                                                                                                                                          | RT                                         | FISSIONABLE MATERIALS<br>JET MEMBRANE PROCESS                                                                                                                                                                                                                                                                                              |



## NASA THESAURUS HIERARCHICAL UPDATE

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...#UREILITES
RT METEORITIC DIAMONDS

URETHANES
1808
GS ESTERS
.CARBAMATES (TRADENAME)
.#URETHANES
RT CYANATES

URIC ACID
O403 1808
GS ACIDS
#URIC ACID
FUNGICIDES
.XANTHINES
.#URIC ACID
NITROGEN COMPOUNDS
.XANTHINES
.#URIC ACID
ORGANIC COMPOUNDS
.CYCLIC COMPOUNDS
..HETEROCYCLIC COMPOUNDS
...PURINES
....XANTHINES
....#URIC ACID
RT ALLOXAN

URIDYLIC ACID
O403 1808
GS ACIDS
#URIDYLIC ACID
ORGANIC COMPOUNDS
.NUCLEOTIDES
.#URIDYLIC ACID
.ORGANIC PHOSPHORUS COMPOUNDS
.#URIDYLIC ACID
PHOSPHORUS COMPOUNDS
.ORGANIC PHOSPHORUS COMPOUNDS
.#URIDYLIC ACID
.PHOSPHATES
.#URIDYLIC ACID
RT AMINO ACIDS
NUCLEIC ACIDS
URACIL

URINALYSIS
O403 O405 O505 O602
GS CHEMICAL TESTS
.CHEMICAL ANALYSIS
.#URINALYSIS
RT DIABETES MELLITUS
PHYSIOLOGICAL TESTS
URINE

URINATION
O404 O408 O505
UF MICTURITION
RT DIURESIS
URINE
WATER BALANCE

URINE
O403 O404 O505
GS BODY FLUIDS
#URINE
WASTES
.LIQUID WASTES
.#URINE
.METABOLIC WASTES
..HUMAN WASTES
..#URINE
RT ANTIIDIURETICS
CREATININE
EXCRETION
FECES
HEMATURIA
KIDNEYS
UREAS
URINALYSIS
URINATION

UROGRAPHY
O405 O501
GS IMAGERY
.RADIOGRAPHY
.#UROGRAPHY
PHOTOGRAPHY
#UROGRAPHY
RT BLACK AND WHITE PHOTOGRAPHY

UROLITHIASIS
O405 O408
GS DISEASES
#UROLITHIASIS
RT CALCULI
KIDNEYS
UROLOGY

UROLOGY
O404 O405
GS MEDICAL SCIENCE
#UROLOGY
RT BLADDER
GENITOURINARY SYSTEM
KIDNEYS
UROLITHIASIS

URUGUAY
1305

GS NATIONS
#URUGUAY
RT SOUTH AMERICA

US-2A AIRCRAFT
USE S-2 AIRCRAFT

USA (UNITED STATES)
USE UNITED STATES

USER MANUALS (COMPUTER PROGRAMS)
O801 O802 3405
GS DOCUMENTS
.HANDBOOKS
.#USER MANUALS (COMPUTER PROGRAMS)
.MANUALS
.#USER MANUALS (COMPUTER PROGRAMS)
RT COMPUTER PROGRAMS
PROGRAMS
REPORT GENERATORS
% ROUTINES
SUBROUTINES

USER REQUIREMENTS
O802
RT COMMERCE LAB
HUMAN-COMPUTER INTERFACE
INTERNATIONAL COOPERATION
REQUIREMENTS
SPECIFICATIONS

USER-COMPUTER INTERFACE
USE HUMAN-COMPUTER INTERFACE

USNS KINGSFORT
USE SATELLITE COMMUNICATIONS SHIPS

UTAH
1305
GS NATIONS
.UNITED STATES
.#UTAH
RT COLORADO PLATEAU (US)
COLORADO RIVER (NORTH AMERICA)
GREAT BASIN (US)
GREAT SALT LAKE (UT)

UTERUS
O404
GS ANATOMY
.GENITOURINARY SYSTEM
..REPRODUCTIVE SYSTEMS
..#UTERUS

UTILITIES

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[illegible]

|                                 |                                   |                                       |
|---------------------------------|-----------------------------------|---------------------------------------|
| ..G-222 AIRCRAFT                | ....UH-2 HELICOPTER               | GROUND EFFECT MACHINES                |
| ..L-29 JET TRAINER              | ....UH-34 HELICOPTER              | HELIPORTS                             |
| ..P-1127 AIRCRAFT               | ....UH-60A HELICOPTER             | HOVERING                              |
| ..P-1154 AIRCRAFT               | ....UH-61A HELICOPTER             | JET AIRCRAFT                          |
| ..ROTARY WING AIRCRAFT          | ....WESTLAND WHIRLWIND HELICOPTER | % MILITARY AIRCRAFT                   |
| ..AUTOGYROS                     | ....XV-9A AIRCRAFT                | PASSENGER AIRCRAFT                    |
| ..AVIAN 2/180 AUTOGIRO          | ....RIGID ROTOR HELICOPTERS       | RECONNAISSANCE AIRCRAFT               |
| ..HELICOPTERS                   | ....CH-3 HELICOPTER               | RESEARCH AIRCRAFT                     |
| ..ALOUETTE HELICOPTERS          | ....F-28 HELICOPTER               | SHORT HAUL AIRCRAFT                   |
| ..SA-330 HELICOPTER             | ....XH-51 HELICOPTER              | STOVL AIRCRAFT                        |
| ..SE-3160 HELICOPTER            | ....TANDEM ROTOR HELICOPTERS      | TILT WING AIRCRAFT                    |
| ..COMPOUND HELICOPTERS          | ....CH-46 HELICOPTER              | TRANSITION FLIGHT                     |
| ..H-17 HELICOPTER               | ....CH-47 HELICOPTER              | TRANSPORT AIRCRAFT                    |
| ..LIGHT HELICOPTERS             | ....H-25 HELICOPTER               | UTILITY AIRCRAFT                      |
| ..OH-4 HELICOPTER               | ....TH-55 HELICOPTER              | VERTICAL FLIGHT                       |
| ..OH-5 HELICOPTER               | ..ROTOR SYSTEMS RESEARCH AIRCRAFT | WESER AIRCRAFT                        |
| ..OH-6 HELICOPTER               | ..TILT ROTOR AIRCRAFT             | WESTLAND AIRCRAFT                     |
| ..OH-58 HELICOPTER              | ....V-22 AIRCRAFT                 |                                       |
| ..MILITARY HELICOPTERS          | ....XV-15 AIRCRAFT                | VACANCIES (CRYSTAL DEFECTS)           |
| ..AH-1G HELICOPTER              | ..SHORT TAKEOFF AIRCRAFT          | 1806 2601                             |
| ..AH-64 HELICOPTER              | ..ALADIN 2 AIRCRAFT               | GS DEFECTS                            |
| ..BELL 214A HELICOPTER          | ..BREGUET 940 AIRCRAFT            | .CRYSTAL DEFECTS                      |
| ..BO-105 HELICOPTER             | ..BREGUET 941 AIRCRAFT            | ..POINT DEFECTS                       |
| ..CH-3 HELICOPTER               | ..C-8A AUGMENTOR WING AIRCRAFT    | ..#VACANCIES (CRYSTAL DEFECTS)        |
| ..CH-21 HELICOPTER              | ..C-15 AIRCRAFT                   | ....FRENKEL DEFECTS                   |
| ..CH-34 HELICOPTER              | ..C-123 AIRCRAFT                  | RT HOLES (ELECTRON DEFICIENCIES)      |
| ..CH-46 HELICOPTER              | ..DHC 4 AIRCRAFT                  | SQUARE WELLS                          |
| ..CH-47 HELICOPTER              | ..DHC 5 AIRCRAFT                  |                                       |
| ..CH-54 HELICOPTER              | ..QUESTOL AIRCRAFT                |                                       |
| ..H-19 HELICOPTER               | ..U-10 AIRCRAFT                   | VACCINES                              |
| ..H-43 HELICOPTER               | ..VERTICAL TAKEOFF AIRCRAFT       | O404 O405 O412                        |
| ..H-53 HELICOPTER               | ..FLYING PLATFORMS                | GS #VACCINES                          |
| ..H-54 HELICOPTER               | ..SC-1 AIRCRAFT                   | .INOCULUM                             |
| ..H-56 HELICOPTER               | ..VJ-101 AIRCRAFT                 | RT ACQUIRED IMMUNODEFICIENCY SYNDROME |
| ..HC-3 HELICOPTER               | ..VZ-8 AIRCRAFT                   | ANTIBODIES                            |
| ..HEAVY LIFT HELICOPTERS        | ..X-13 AIRCRAFT                   | ANTIGENS                              |
| ..CH-62 HELICOPTER              | ..X-14 AIRCRAFT                   | ANTISERUMS                            |
| ..HH-43 HELICOPTER              | ..X-19 AIRCRAFT                   | BACTERIOLOGY                          |
| ..OH-4 HELICOPTER               | ..X-22 AIRCRAFT                   | BIOCOMPATIBILITY                      |
| ..OH-5 HELICOPTER               | ..X-22A AIRCRAFT                  | DISEASES                              |
| ..OH-6 HELICOPTER               | ..XC-142 AIRCRAFT                 | DRUGS                                 |
| ..OH-13 HELICOPTER              | ..XV-4 AIRCRAFT                   | EPIDEMIOLOGY                          |
| ..OH-23 HELICOPTER              | ..OH-11A AIRCRAFT                 | HUMAN IMMUNODEFICIENCY VIRUS          |
| ..OH-58 HELICOPTER              | ..VZ-2 AIRCRAFT                   | INOCULATION                           |
| ..P-531 HELICOPTER              | ..XV-3 AIRCRAFT                   | TOXICOLOGY                            |
| ..OH-50 HELICOPTER              | ..XV-5 AIRCRAFT                   | TOXINS AND ANTITOXINS                 |
| ..S-58 HELICOPTER               | ..XV-8A AIRCRAFT                  |                                       |
| ..S-61 HELICOPTER               | RT % AIRCRAFT                     | VACCINATION                           |
| ..SA-321 HELICOPTER             | ANTISUBMARINE WARFARE AIRCRAFT    | O408 O410                             |
| ..SA-330 HELICOPTER             | ATTACK AIRCRAFT                   | RT DITHERS                            |
| ..SH-3 HELICOPTER               | COMMERCIAL AIRCRAFT               | HUMAN REACTIONS                       |
| ..SH-4 HELICOPTER               | CONVERTIBLE FAN-SHAFT ENGINES     |                                       |
| ..SIKORSKY WHIRLWIND HELICOPTER | DRONE AIRCRAFT                    | VACUUM                                |
| ..UH-1 HELICOPTER               | FAN IN WING AIRCRAFT              | 1408 1506 2311                        |
|                                 | FIGHTER AIRCRAFT                  | UF ASPIRATION                         |
|                                 |                                   | GS PRESSURE                           |



# NASA THESAURUS HIERARCHICAL UPDATE

#VACUUM  
 ..HIGH VACUUM  
 ..LOW VACUUM  
 ..ULTRAHIGH VACUUM  
 AEROSPACE ENVIRONMENTS  
 BOUNDARY LAYER CONTROL  
 EVACUATING (VACUUM)  
 GETTERS  
 HIGH PRESSURE  
 KNUDSEN FLOW  
 LOW PRESSURE  
 MEAN FREE PATH  
 OFFGASSING  
 OUTGASSING  
 PRESSURE MEASUREMENT  
 RAREFACTION  
 SUCTION  
 VACUUM APPARATUS  
 O905 1203 1506 3501  
 GS #VACUUM APPARATUS  
 .VACUUM CHAMBERS  
 .VACUUM FURNACES  
 .VACUUM GAGES  
 ..IONIZATION GAGES  
 ...ALPHATRONS  
 ...BAYARD-ALPERT IONIZATION GAGES  
 ...PENNING GAGES  
 ...PHILIPS IONIZATION GAGES  
 ...KNUDSEN GAGES  
 ..MCLEOD GAGES  
 ..PIRANI GAGES  
 .VACUUM PUMPS  
 ..CONDENSATION PUMPS  
 ..ION PUMPS  
 ..MOLECULAR PUMPS  
 COLD TRAPS  
 DIFFUSION PUMPS  
 HIGH VACUUM  
 LOW DENSITY RESEARCH  
 RESIDUAL GAS  
 SUCTION  
 ULTRAHIGH VACUUM  
 VACUUM ARC SWITCHES  
 VACUUM ARC SWITCHES  
 O801  
 GS SWITCHES  
 .ELECTRIC SWITCHES  
 .#VACUUM ARC SWITCHES  
 AIRBORNE EQUIPMENT  
 SWITCHING CIRCUITS  
 VACUUM APPARATUS  
 VACUUM EFFECTS

VACUUM CHAMBERS  
 1106 1108 1203 1506 3501  
 UF LOW PRESSURE CHAMBERS  
 GS COMPARTMENTS  
 .TEST CHAMBERS  
 ..PRESSURE CHAMBERS  
 ..#VACUUM CHAMBERS  
 VACUUM APPARATUS  
 #VACUUM CHAMBERS  
 RT ALTITUDE SIMULATION  
 % CHAMBERS  
 HIGH ALTITUDE ENVIRONMENTS  
 HIGH ALTITUDE PRESSURE  
 HYPERBARIC CHAMBERS  
 PRESSURE  
 SPACE ENVIRONMENT SIMULATION  
 SPACE SIMULATORS  
 THERMAL VACUUM TESTS  
 WIND TUNNEL DRIVES  
 VACUUM DEPOSITION  
 1506 1507 1802  
 GS DEPOSITION  
 .VAPOR DEPOSITION  
 .#VACUUM DEPOSITION  
 CERAMIC COATINGS  
 DIAMOND FILMS  
 ELECTROLESS DEPOSITION  
 ION PLATING  
 VACUUM EFFECTS  
 1203 1506 1704 2304 2601 3501  
 RT COLD WELDING  
 % EFFECTS  
 ENVIRONMENTS  
 OFFGASSING  
 PRESSURE EFFECTS  
 SPACE MANUFACTURING  
 VACUUM ARC SWITCHES  
 VACUUM FURNACES  
 1504 1506 3303  
 GS HEATING EQUIPMENT  
 .FURNACES  
 .#VACUUM FURNACES  
 VACUUM APPARATUS  
 #VACUUM FURNACES  
 RT SOLAR FURNACES  
 VACUUM GAGES  
 1408 1506 2001 2003 3501  
 GS MEASURING INSTRUMENTS  
 .PRESSURE GAGES  
 .#VACUUM GAGES  
 ...IONIZATION GAGES

....ALPHATRONS  
 ...BAYARD-ALPERT IONIZATION GAGES  
 ...PENNING GAGES  
 ...PHILIPS IONIZATION GAGES  
 ...KNUDSEN GAGES  
 ...MCLEOD GAGES  
 ...PIRANI GAGES  
 VACUUM APPARATUS  
 #VACUUM GAGES  
 ..IONIZATION GAGES  
 ...ALPHATRONS  
 ...BAYARD-ALPERT IONIZATION GAGES  
 ...PENNING GAGES  
 ...PHILIPS IONIZATION GAGES  
 ...KNUDSEN GAGES  
 ..MCLEOD GAGES  
 ..PIRANI GAGES  
 RT BAROMETERS  
 MANOMETERS  
 ORBITRONS  
 PRESSURE MEASUREMENT  
 VACUUM MELTING  
 1506 1704 3303  
 GS PHASE TRANSFORMATIONS  
 .MELTING  
 .#VACUUM MELTING  
 ARC MELTING  
 INDUCTION HEATING  
 LEVITATION  
 POWDER METALLURGY  
 ZONE MELTING  
 VACUUM PUMPS  
 1202 1501 1504 1506  
 GS PUMPS  
 #VACUUM PUMPS  
 ..CONDENSATION PUMPS  
 ..ION PUMPS  
 ..MOLECULAR PUMPS  
 VACUUM APPARATUS  
 #VACUUM PUMPS  
 ..CONDENSATION PUMPS  
 ..ION PUMPS  
 ..MOLECULAR PUMPS  
 COMPRESSORS  
 CRYOPUMPING  
 DIFFUSION PUMPS  
 EJECTORS  
 EVACUATING (VACUUM)  
 JET PUMPS  
 MATERIALS HANDLING  
 OUTGASSING  
 SUCTION

VACUUM SPECTROSCOPY  
 O601 1411 1506  
 GS SPECTROSCOPY  
 #VACUUM SPECTROSCOPY  
 RT GAS SPECTROSCOPY  
 INFRARED SPECTROSCOPY  
 MAGNETIC SPECTROSCOPY  
 MASS SPECTROSCOPY  
 MOLECULAR SPECTROSCOPY  
 NUCLEAR RADIATION SPECTROSCOPY  
 SPECTROSCOPIC ANALYSIS  
 ULTRAVIOLET SPECTROSCOPY  
 X RAY SPECTROSCOPY

...TRAVELING WAVE TUBES  
 ...BACKWARD WAVE TUBES  
 ...HELITRONS  
 ...CARCINOTRONS  
 ..VACUUM TUBE OSCILLATORS  
 RT PENTODES  
 PERVEANCE  
 RESIDUAL GAS

VACUUM ULTRAVIOLET RADIATION  
 USE FAR ULTRAVIOLET RADIATION

VADOSE WATER  
 1305  
 GS WATER  
 #VADOSE WATER  
 RT COASTAL WATER  
 EVAPOTRANSPIRATION  
 LAKE TEXOMA (OK-TX)  
 NEARSHORE WATER  
 RIVER BASINS  
 SOILS  
 WATER TABLES

VALENCE  
 O603 2401 2405  
 GS #VALENCE  
 .OCTETS  
 RT CHEMICAL BONDS  
 CONDUCTION ELECTRONS  
 ION CHARGE  
 IONS  
 POSITIVE IONS  
 QUANTUM WELLS  
 TRIVALENT IONS

VALERIC ACID  
 1808  
 GS ACIDS  
 .CARBOXYLIC ACIDS  
 ..FATTY ACIDS  
 ..#VALERIC ACID  
 ORGANIC COMPOUNDS  
 .CARBOXYLIC ACIDS  
 ..FATTY ACIDS  
 ..#VALERIC ACID

VALIANT AIRCRAFT  
 O207  
 UF VICKERS VALIANT AIRCRAFT  
 GS ATTACK AIRCRAFT  
 .BOMBER AIRCRAFT  
 .#VALIANT AIRCRAFT  
 BAC AIRCRAFT  
 #VALIANT AIRCRAFT

VACUUM TUBES  
 O701 0903 0905 1506  
 GS ELECTRON TUBES  
 #VACUUM TUBES  
 ..CATHODE RAY TUBES  
 ...PICTURE TUBES  
 ...CESIUM DIODES  
 ...MICROWAVE TUBES  
 ...CELESCOPES  
 ...CYCLOTRON RESONANCE DEVICES  
 ...KLYSTRONS  
 ...MAGNETRONS  
 ...NIGOTRONS  
 ...PLANOTRONS

VACUUM TUBE OSCILLATORS  
 O710 0903 0905 1506  
 GS ELECTRON TUBES  
 .VACUUM TUBES  
 .#VACUUM TUBE OSCILLATORS  
 OSCILLATORS  
 #VACUUM TUBE OSCILLATORS  
 RT AUTODYNES  
 FREQUENCY MODULATION  
 PHOTOMULTIPLIERS  
 MICROWAVE OSCILLATORS

VALKYRIE AIRCRAFT  
 USE B-70 AIRCRAFT

VALLEYS  
 1305 1306 3009  
 UF INTERMONTANE FLOORS  
 RIFT VALLEYS  
 RILLS  
 GS #VALLEYS  
 .COACHELLA VALLEY (CA)  
 .DEATH VALLEY (CA)  
 .IMPERIAL VALLEY (CA)  
 .MAGDALENA-CAUCA VALLEY (COLOMBIA)  
 .PALO VERDE VALLEY (CA)  
 .POTOMAC RIVER VALLEY (MD-VA-WV)  
 .SACRAMENTO VALLEY (CA)  
 .SAN JOAQUIN VALLEY (CA)  
 .SHENANDOAH VALLEY (VA)  
 .ST LAWRENCE VALLEY (NORTH AMERICA)  
 .TENNESSEE VALLEY (AL-KY-TN)  
 CANYONS  
 DELAWARE RIVER BASIN (US)  
 EROSION  
 MEANDERS  
 MISSOURI RIVER (US)  
 RAVINES  
 RIVERS

VALIDATION  
 USE PROVING

VALIDITY  
 1902  
 RT ACCEPTABILITY  
 ACCURACY  
 ADEQUACY  
 CONSISTENCY  
 CORRELATION  
 EXISTENCE  
 MATHEMATICAL MODELS  
 PRECISION  
 QUALITY  
 RELIABILITY  
 SIMULATION  
 STANDARDS  
 STATISTICAL TESTS  
 VARIABILITY

VALLEY  
 1305 1306 3009  
 UF INTERMONTANE FLOORS  
 RIFT VALLEYS  
 RILLS  
 GS #VALLEYS  
 .COACHELLA VALLEY (CA)  
 .DEATH VALLEY (CA)  
 .IMPERIAL VALLEY (CA)  
 .MAGDALENA-CAUCA VALLEY (COLOMBIA)  
 .PALO VERDE VALLEY (CA)  
 .POTOMAC RIVER VALLEY (MD-VA-WV)  
 .SACRAMENTO VALLEY (CA)  
 .SAN JOAQUIN VALLEY (CA)  
 .SHENANDOAH VALLEY (VA)  
 .ST LAWRENCE VALLEY (NORTH AMERICA)  
 .TENNESSEE VALLEY (AL-KY-TN)  
 CANYONS  
 DELAWARE RIVER BASIN (US)  
 EROSION  
 MEANDERS  
 MISSOURI RIVER (US)  
 RAVINES  
 RIVERS

# NASA THESAURUS HIERARCHICAL UPDATE

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STRUCTURAL BASINS
SUSQUEHANNA RIVER BASIN (MD-NY-PA)
TOPOGRAPHY
WADIS
WATERSHEDS

VALSALVA EXERCISE
O401 O405 O408
UF VALSALVA MANEUVER
RT RESPIRATION

VALSALVA MANEUVER
USE VALSALVA EXERCISE

VALUE
1902 3406 3408
GS #VALUE
.O VALUES
RT AMOUNT
ASSESSMENTS
COSTS
DAMAGE ASSESSMENT
ESTIMATES
ESTIMATING
EVALUATION
FIGURE OF MERIT
LEVEL (QUANTITY)
NORMS
RANKING
TECHNOLOGY ASSESSMENT

VALUE ENGINEERING
3404 3406
RT COST ANALYSIS
COST ESTIMATES
COST INCENTIVES
COST REDUCTION
DESIGN ANALYSIS
ECONOMIC ANALYSIS
% ENGINEERING
INCENTIVE TECHNIQUES
LIFE CYCLE COSTS
MANAGEMENT PLANNING
QUALITY CONTROL
RELIABILITY ENGINEERING
STANDARDS
TOTAL QUALITY MANAGEMENT

VALVES
O202 1501 1504 2806 O401 O404
UF HYDRAULIC VALVES
GS #VALVES
.ARTIFICIAL HEART VALVES
.AUTOMATIC CONTROL VALVES
..PRESSURE REGULATORS

..RELIEF VALVES
.BUTTERFLY VALVES
..DAMPERS (VALVES)
.COCKS
.CONTROL VALVES
.FUEL VALVES
.GAS VALVES
.HEART VALVES
.SOLENOID VALVES
RT BALLS
CHOKES (RESTRICTIONS)
CLOSURES
DIVERTERS
ENGINE PARTS
HYDRAULIC EQUIPMENT
PACKINGS (SEALS)
PNEUMATIC CIRCUITS
PNEUMATIC EQUIPMENT
SEALS (STOPPERS)
TRAPS
WATER HAMMER

VAMPIRE AIRCRAFT
USE DH 115 AIRCRAFT

VAMPIRE MK 35 AIRCRAFT
O207
GS ATTACK AIRCRAFT
.FIGHTER AIRCRAFT
.#VAMPIRE MK 35 AIRCRAFT
HAWKER SIDDELEY AIRCRAFT
#VAMPIRE MK 35 AIRCRAFT
JET AIRCRAFT
#VAMPIRE MK 35 AIRCRAFT
SINGLE ENGINE AIRCRAFT
#VAMPIRE MK 35 AIRCRAFT
RT % AIRCRAFT
BOMBER AIRCRAFT
HARRIER AIRCRAFT

VAN ALLEN RADIATION BELTS
USE RADIATION BELTS

VAN BIESBROECK STAR
3001
GS CELESTIAL BODIES
.STARS
..LATE STARS
...COOL STARS
....M STARS
....#VAN BIESBROECK STAR

VAN DE GRAAFF ACCELERATORS
O302 2304 2403
GS PARTICLE ACCELERATORS

..VAN DE GRAAFF ACCELERATORS
RT % ACCELERATORS
ELECTRON ACCELERATORS

VAN DER WAALS FORCES
O603 1203 2404 3304 3501
RT DIPOLE MOMENTS
% FORCE
INTERATOMIC FORCES
INTERMOLECULAR FORCES

VAN SLYKE METHOD
O403 O601 1808
GS CHEMICAL TESTS
.CHEMICAL ANALYSIS
..GAS ANALYSIS
..#VAN SLYKE METHOD
..QUANTITATIVE ANALYSIS
..#VAN SLYKE METHOD
RT % METHODOLOGY

VANADATES
O603 1804
GS VANADIUM COMPOUNDS
#VANADATES
..CALCIUM VANADATES
RT METAL OXIDES
VANADIUM OXIDES

VANADIUM
1703
GS CHEMICAL ELEMENTS
#VANADIUM
..VANADIUM ISOTOPES
METALS
.TRANSITION METALS
.#VANADIUM
...VANADIUM ISOTOPES
RT VANADIUM ALLOYS

VANADIUM ALLOYS
1701 1704
GS ALLOYS
#VANADIUM ALLOYS
RT ALUMINUM ALLOYS
MICROSTRUCTURE
TITANIUM ALLOYS
VANADIUM

VANADIUM CARBIDES
O603 1804
GS CARBON COMPOUNDS
.CARBIDES
.#VANADIUM CARBIDES
VANADIUM COMPOUNDS

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[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

|                                                          |                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT                                                       | COATING<br>COATINGS<br>CRYSTAL GROWTH<br>DIAMOND FILMS<br>ELECTROLESS DEPOSITION<br>LASER DEPOSITION<br>METAL VAPORS<br>METALLIZING<br>PULSED LASER DEPOSITION<br>ULTRAPURE METALS<br>VAPORIZERS<br>VAPORIZING                                                               |  | SOLIDS<br>COATINGS<br>CRITICAL PRESSURES<br>VAPORS<br>VOLATILITY                                                                                                                                                                                                                                                                                                                                             |  | SPRAYERS<br>VAPOR DEPOSITION<br>VAPORIZING<br>VAPORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| VAPOR GENERATORS<br>USE VAPORIZERS                       |                                                                                                                                                                                                                                                                              |  | VAPOR PRESSURE<br>O603 1203 1408 2003<br>GS PRESSURE<br>#VAPOR PRESSURE<br>THERMODYNAMIC PROPERTIES<br>. THERMOPHYSICAL PROPERTIES<br>. #VAPOR PRESSURE<br>DALTON LAW<br>FLASH POINT<br>FUEL TANK PRESSURIZATION<br>HENRY LAW<br>HUMIDITY<br>INTERFACIAL TENSION<br>LIQUID-GAS MIXTURES<br>LIQUID-VAPOR INTERFACES<br>PARTIAL PRESSURE<br>RAOULT LAW<br>SUBLIMATION<br>SUPERCRITICAL PRESSURES<br>VOLATILITY |  | VAPORIZING<br>O602 1203 3303 3501<br>UF VOLATILIZATION<br>GS PHASE TRANSFORMATIONS<br>#VAPORIZING<br>..BOILING<br>...FILM BOILING<br>...NUCLEATE BOILING<br>...LEIDENFROST PHENOMENON<br>..EVAPORATION<br>...EVAPOTRANSPIRATION<br>...PROPELLANT EVAPORATION<br>...TRANSPIRATION<br>..FLASHING (VAPORIZING)<br>..PREVAPORIZATION<br>..SUBLIMATION<br>RT ABLATION<br>CONCENTRATING<br>DESALINIZATION<br>DISTILLATION<br>EVOLUTION (LIBERATION)<br>GASIFICATION<br>HEAT OF VAPORIZATION<br>HEATING<br>% SEPARATION<br>SEPARATION<br>STRIPPING (DISTILLATION)<br>SURFACE REACTIONS<br>VAPOR DEPOSITION<br>VAPORIZERS<br>VAPORS<br>VOLATILITY |
| VAPOR LIQUID EQUILIBRIUM<br>USE LIQUID-VAPOR EQUILIBRIUM |                                                                                                                                                                                                                                                                              |  | VAPOR TRAILS<br>USE CONTRAILS                                                                                                                                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VAPOR PHASE EPITAXY<br>2601 GS                           | GROWTH<br>- CRYSTAL GROWTH<br>..EPITAXY<br>..#VAPOR PHASE EPITAXY<br>CRYSTAL STRUCTURE<br>LIQUID PHASE EPITAXY<br>LIQUID PHASES                                                                                                                                              |  | VAPOR TRAPS<br>1203 GS<br>TRAPS<br>#VAPOR TRAPS<br>RT COLD TRAPS<br>GETTERS<br>ION TRAPS (INSTRUMENTATION)                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VAPOR PHASES<br>O602 1203 UF GAS PHASES                  | ASSOCIATION REACTIONS<br>CRITICAL PRESSURE<br>GAS-METAL INTERACTIONS<br>GAS-SOLID INTERFACES<br>GASES<br>HYDROGEN CLOUDS<br>LIQUID PHASES<br>LIQUID-GAS MIXTURES<br>LIQUID-VAPOR INTERFACES<br>LIQUIDS<br>METAL-GAS SYSTEMS<br>PHASE DIAGRAMS<br>% PHASES<br>PREVAPORIZATION |  | VAPORIZATION HEAT<br>USE HEAT OF VAPORIZATION                                                                                                                                                                                                                                                                                                                                                                |  | VAPORS<br>O504 0603 1308 1704 1805 2003 2311<br>3304 GS<br>#VAPORS<br>.CESIUM VAPOR<br>.METAL VAPORS<br>..MERCURY VAPOR<br>..SODIUM VAPOR<br>..WATER VAPOR<br>CAVITY VAPOR GENERATORS<br>COMBUSTION PRODUCTS<br>CONDENSATES<br>EXHAUST GASES<br>FUMES<br>GASES<br>HAZE DETECTION<br>HYDROGEN CLOUDS                                                                                                                                                                                                                                                                                                                                       |

[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

| #VARIABLE STREAM CONTROL ENGINES |  | VARIANCE (STATISTICS) |                                     |
|----------------------------------|--|-----------------------|-------------------------------------|
| RT % CONTROL                     |  | VARIANCE (STATISTICS) |                                     |
| ENGINE CONTROL                   |  | 1902                  |                                     |
| SUPERSONIC AIRCRAFT              |  | GS                    |                                     |
| SUPERSONIC NOZZLES               |  |                       | STATISTICAL ANALYSIS                |
| VARIABLE CYCLE ENGINES           |  |                       | #VARIANCE (STATISTICS)              |
|                                  |  |                       | ..ANALYSIS OF VARIANCE              |
|                                  |  |                       | ..MULTIVARIATE STATISTICAL ANALYSIS |
|                                  |  |                       | ...BIVARIATE ANALYSIS               |
|                                  |  |                       | ...COVARIANCE                       |
|                                  |  |                       | ...REGRESSION ANALYSIS              |
|                                  |  |                       | CONFIDENCE LIMITS                   |
|                                  |  |                       | CORRELATION                         |
|                                  |  |                       | DISTRIBUTION MOMENTS                |
|                                  |  |                       | EXPERIMENT DESIGN                   |
|                                  |  |                       | FACTOR ANALYSIS                     |
|                                  |  |                       | GAUSS-MARKOV THEOREM                |
|                                  |  |                       | GOODNESS OF FIT                     |
|                                  |  |                       | HETEROGENEITY                       |
|                                  |  |                       | HOMOGENEITY                         |
|                                  |  |                       | KRIGING                             |
|                                  |  |                       | MEAN                                |
|                                  |  |                       | MOMENTS                             |
|                                  |  |                       | QUALITY CONTROL                     |
|                                  |  |                       | RANGE (EXTREMES)                    |
|                                  |  |                       | STANDARD DEVIATION                  |
|                                  |  |                       | VARIABILITY                         |
|                                  |  |                       | % VARIANCE                          |
|                                  |  |                       |                                     |
|                                  |  |                       | VARIATION METHOD                    |
|                                  |  |                       | USE CALCULUS OF VARIATIONS          |
|                                  |  |                       |                                     |
|                                  |  |                       | VARIATIONAL PRINCIPLES              |
|                                  |  |                       | O603 1202 1902 2308 2311            |
|                                  |  |                       | RT CALCULUS OF VARIATIONS           |
|                                  |  |                       | % DYNAMICS                          |
|                                  |  |                       | EQUILIBRIUM METHODS                 |
|                                  |  |                       | IRREVERSIBLE PROCESSES              |
|                                  |  |                       | ONSAGER PHENOMENOLOGICAL            |
|                                  |  |                       | COEFFICIENT                         |
|                                  |  |                       | RAYLEIGH-RITZ METHOD                |
|                                  |  |                       |                                     |
|                                  |  |                       | VARIATIONS                          |
|                                  |  |                       | 1902                                |
|                                  |  |                       | UF FLUCTUATION                      |
|                                  |  |                       | GS #VARIATIONS                      |
|                                  |  |                       | ..MAGNETIC VARIATIONS               |
|                                  |  |                       | ..GEOMAGNETIC PULSATIONS            |
|                                  |  |                       | ...GEOMAGNETIC MICROPULSATIONS      |
|                                  |  |                       | ..NOCTURNAL VARIATIONS              |
|                                  |  |                       | ..PERIODIC VARIATIONS               |
|                                  |  |                       | ..ALTERNATIONS                      |
|                                  |  |                       | ..ANNUAL VARIATIONS                 |
|                                  |  |                       | ..DIURNAL VARIATIONS                |
|                                  |  |                       | ..NOCTURNAL VARIATIONS              |
|                                  |  |                       |                                     |
|                                  |  |                       | VASCULAR SYSTEM                     |
|                                  |  |                       | USE CARDIOVASCULAR SYSTEM           |
|                                  |  |                       |                                     |
|                                  |  |                       | VASOCONSTRICTION                    |
|                                  |  |                       | O404 O408                           |
|                                  |  |                       | RT BLOOD VESSELS                    |
|                                  |  |                       | BODY TEMPERATURE                    |
|                                  |  |                       | COLD TOLERANCE                      |
|                                  |  |                       |                                     |
|                                  |  |                       | VARNISHES                           |
|                                  |  |                       | 1808                                |
|                                  |  |                       | RT FILLERS                          |
|                                  |  |                       | FINISHES                            |
|                                  |  |                       | PAINTS                              |
|                                  |  |                       | PRIMERS (COATINGS)                  |
|                                  |  |                       | PROTECTIVE COATINGS                 |
|                                  |  |                       | SEALERS                             |
|                                  |  |                       | SPRAYED COATINGS                    |
|                                  |  |                       |                                     |
|                                  |  |                       | VARIOMETERS                         |
|                                  |  |                       | 1307 1308 1406 2307                 |
|                                  |  |                       | UF MAGNETOVARIOMETERS               |
|                                  |  |                       | GS MEASURING INSTRUMENTS            |
|                                  |  |                       | .MAGNETOMETERS                      |
|                                  |  |                       | .#VARIOMETERS                       |
|                                  |  |                       | RT GEOMAGNETISM                     |
|                                  |  |                       |                                     |
|                                  |  |                       | VARIATORS                           |
|                                  |  |                       | O903 O905 O906                      |
|                                  |  |                       | GS ELECTRONIC EQUIPMENT             |
|                                  |  |                       | .SOLID STATE DEVICES                |
|                                  |  |                       | ..SEMICONDUCTOR DEVICES             |
|                                  |  |                       | ..#VARIATORS                        |
|                                  |  |                       | RT RESISTORS                        |
|                                  |  |                       | THERMISTORS                         |
|                                  |  |                       | VARIATOR DIODES                     |
|                                  |  |                       |                                     |
|                                  |  |                       | VARIABLE THRUST                     |
|                                  |  |                       | O101 2805 2808                      |
|                                  |  |                       | GS THRUST                           |
|                                  |  |                       | #VARIABLE THRUST                    |
|                                  |  |                       | CONTROL ROCKETS                     |
|                                  |  |                       | HIGH THRUST                         |
|                                  |  |                       | JET CONTROL                         |
|                                  |  |                       | JET THRUST                          |
|                                  |  |                       | LOW THRUST                          |
|                                  |  |                       | LOW THRUST PROPULSION               |
|                                  |  |                       | MICROTHRUST                         |
|                                  |  |                       | ROCKET THRUST                       |
|                                  |  |                       | THROTTLING                          |
|                                  |  |                       | THRUST AUGMENTATION                 |
|                                  |  |                       | THRUST CONTROL                      |
|                                  |  |                       | THRUST TERMINATION                  |
|                                  |  |                       | THRUST VECTOR CONTROL               |
|                                  |  |                       |                                     |
|                                  |  |                       | % VARIANCE                          |
|                                  |  |                       | 1902 1905                           |
|                                  |  |                       | SN (USE OF A MORE SPECIFIC TERM IS  |
|                                  |  |                       | RECOMMENDED--CONSULT THE TERMS      |
|                                  |  |                       | LISTED BELOW)                       |
|                                  |  |                       | RT ANALYSIS OF VARIANCE             |
|                                  |  |                       | DEGREES OF FREEDOM                  |
|                                  |  |                       | MULTIVARIATE STATISTICAL ANALYSIS   |

[illegible]



# NASA THESAURUS HIERARCHICAL UPDATE

|                               |                                  |  |  |  |  |
|-------------------------------|----------------------------------|--|--|--|--|
| ...                           | MESONS                           |  |  |  |  |
| ...                           | #VECTOR MESONS                   |  |  |  |  |
| ...                           | RHO-MESONS                       |  |  |  |  |
| ...                           | SIGMA-MESONS                     |  |  |  |  |
| VECTOR PROCESSING (COMPUTERS) |                                  |  |  |  |  |
| 0803                          |                                  |  |  |  |  |
| GS                            | DATA PROCESSING                  |  |  |  |  |
| RT                            | #VECTOR PROCESSING (COMPUTERS)   |  |  |  |  |
|                               | MULTIPROCESSING (COMPUTERS)      |  |  |  |  |
|                               | PARALLEL PROCESSING (COMPUTERS)  |  |  |  |  |
|                               | PIPELINING (COMPUTERS)           |  |  |  |  |
| VECTOR QUANTIZATION           |                                  |  |  |  |  |
| 1902                          |                                  |  |  |  |  |
| RT                            | CODING                           |  |  |  |  |
|                               | DATA COMPRESSION                 |  |  |  |  |
|                               | DIGITAL TECHNIQUES               |  |  |  |  |
|                               | IMAGE PROCESSING                 |  |  |  |  |
|                               | VECTORS (MATHEMATICS)            |  |  |  |  |
|                               | VOICE DATA PROCESSING            |  |  |  |  |
| VECTOR SPACES                 |                                  |  |  |  |  |
| 1902                          |                                  |  |  |  |  |
| UF                            | GRASSMANN ALGEBRA                |  |  |  |  |
|                               | VECTOR CALCULUS                  |  |  |  |  |
| GS                            | ALGEBRA                          |  |  |  |  |
|                               | #VECTOR SPACES                   |  |  |  |  |
|                               | BANACH SPACE                     |  |  |  |  |
|                               | HILBERT SPACE                    |  |  |  |  |
|                               | SOBOLEV SPACE                    |  |  |  |  |
|                               | MATRICES (MATHEMATICS)           |  |  |  |  |
|                               | ADJOINTS                         |  |  |  |  |
|                               | CANONICAL FORMS                  |  |  |  |  |
|                               | EIGENVALUES                      |  |  |  |  |
|                               | EIGENVECTORS                     |  |  |  |  |
|                               | HESSIAN MATRICES                 |  |  |  |  |
|                               | JORDAN FORM                      |  |  |  |  |
|                               | STIFFNESS MATRIX                 |  |  |  |  |
|                               | STOKES THEOREM (VECTOR CALCULUS) |  |  |  |  |
|                               | U SPIN SPACE                     |  |  |  |  |
|                               | VECTORS (MATHEMATICS)            |  |  |  |  |
|                               | EIGENVECTORS                     |  |  |  |  |
|                               | STATE VECTORS                    |  |  |  |  |
|                               | VORTICITY                        |  |  |  |  |
| RT                            | ANALYSIS (MATHEMATICS)           |  |  |  |  |
|                               | CHAPLYGIN EQUATION               |  |  |  |  |
|                               | HERMITIAN POLYNOMIAL             |  |  |  |  |
|                               | HODOGRAPHS                       |  |  |  |  |
|                               | KAKUTANI THEOREM                 |  |  |  |  |
|                               | LINEAR TRANSFORMATIONS           |  |  |  |  |
| VECTORCARDIOGRAPHY            |                                  |  |  |  |  |
| 0401                          |                                  |  |  |  |  |
| GS                            | BIOENGINEERING                   |  |  |  |  |
|                               | BIOMETRICS                       |  |  |  |  |
|                               | CARDIOGRAPHY                     |  |  |  |  |
|                               | #VECTORCARDIOGRAPHY              |  |  |  |  |
|                               | ELECTROCARDIOGRAPHY              |  |  |  |  |
|                               | PHONOCARDIOGRAPHY                |  |  |  |  |
| RT                            |                                  |  |  |  |  |
|                               | VECTORS (MATHEMATICS)            |  |  |  |  |
|                               | 1902                             |  |  |  |  |
|                               | 2311                             |  |  |  |  |
|                               | GS                               |  |  |  |  |
|                               | ALGEBRA                          |  |  |  |  |
|                               | VECTOR SPACES                    |  |  |  |  |
|                               | #VECTORS (MATHEMATICS)           |  |  |  |  |
|                               | EIGENVECTORS                     |  |  |  |  |
|                               | STATE VECTORS                    |  |  |  |  |
|                               | VORTICITY                        |  |  |  |  |
|                               | DYADICS                          |  |  |  |  |
|                               | FLUX VECTOR SPLITTING            |  |  |  |  |
|                               | FUNCTION SPACE                   |  |  |  |  |
|                               | SCHWARTZ INEQUALITY              |  |  |  |  |
|                               | VECTOR QUANTIZATION              |  |  |  |  |
| RT                            |                                  |  |  |  |  |
|                               | VEGA LAUNCH VEHICLE              |  |  |  |  |
|                               | 3106                             |  |  |  |  |
|                               | 3409                             |  |  |  |  |
|                               | UF                               |  |  |  |  |
|                               | VEGA ROCKET VEHICLE              |  |  |  |  |
|                               | LAUNCH VEHICLES                  |  |  |  |  |
|                               | #VEGA LAUNCH VEHICLE             |  |  |  |  |
|                               | ROCKET VEHICLES                  |  |  |  |  |
|                               | MULTISTAGE ROCKET VEHICLES       |  |  |  |  |
|                               | #VEGA LAUNCH VEHICLE             |  |  |  |  |
|                               | ATLAS D ICBM                     |  |  |  |  |
| RT                            |                                  |  |  |  |  |
|                               | LIQUID PROPELLANT ROCKET ENGINES |  |  |  |  |
| VEGA PROJECT                  |                                  |  |  |  |  |
| 3108                          |                                  |  |  |  |  |
| 3009                          |                                  |  |  |  |  |
| RT                            | FLYBY MISSIONS                   |  |  |  |  |
|                               | HALLEY'S COMET                   |  |  |  |  |
|                               | INTERNATIONAL COOPERATION        |  |  |  |  |
|                               | U.S.S.R. SPACE PROGRAM           |  |  |  |  |
|                               | VENERA SATELLITES                |  |  |  |  |
|                               | VENUS (PLANET)                   |  |  |  |  |
| VEGA ROCKET VEHICLE           |                                  |  |  |  |  |
| USE                           | VEGA LAUNCH VEHICLE              |  |  |  |  |
| VEGARD-KAPLAN BANDS           |                                  |  |  |  |  |
| 0601                          |                                  |  |  |  |  |
| 1411                          |                                  |  |  |  |  |
| 2306                          |                                  |  |  |  |  |
| GS                            | SPECTRA                          |  |  |  |  |
|                               | SPECTRAL BANDS                   |  |  |  |  |
|                               | #VEGARD-KAPLAN BANDS             |  |  |  |  |
| RT                            | % BANDS                          |  |  |  |  |
|                               | EMISSION SPECTRA                 |  |  |  |  |
|                               | MOLECULAR SPECTRA                |  |  |  |  |
|                               | NITROGEN                         |  |  |  |  |
| VEGETABLES                    |                                  |  |  |  |  |
| 0409                          |                                  |  |  |  |  |
| 0505                          |                                  |  |  |  |  |
|                               | BIOMASS ENERGY PRODUCTION        |  |  |  |  |
|                               | EARTH RESOURCES                  |  |  |  |  |
|                               | LOCUSTS                          |  |  |  |  |
|                               | OASES                            |  |  |  |  |
|                               | PLANTS (BOTANY)                  |  |  |  |  |
|                               | RAIN FORESTS                     |  |  |  |  |
|                               | RESOURCES                        |  |  |  |  |
|                               | SEA GRASSES                      |  |  |  |  |
|                               | TREES (PLANTS)                   |  |  |  |  |
| VEGETATION GROWTH             |                                  |  |  |  |  |
| 0409                          |                                  |  |  |  |  |
| 0411                          |                                  |  |  |  |  |
| 0412                          |                                  |  |  |  |  |
| 0505                          |                                  |  |  |  |  |
| GS                            | GROWTH                           |  |  |  |  |
|                               | #VEGETATION GROWTH               |  |  |  |  |
|                               | CROP GROWTH                      |  |  |  |  |
|                               | AGRICULTURE                      |  |  |  |  |
|                               | BIOCHEMISTRY                     |  |  |  |  |
|                               | BOTANY                           |  |  |  |  |
|                               | CROP VIGOR                       |  |  |  |  |
|                               | ECOLOGY                          |  |  |  |  |
|                               | FERTILIZERS                      |  |  |  |  |
|                               | GRAVITROPISM                     |  |  |  |  |
|                               | HYDROPONICS                      |  |  |  |  |
|                               | IRRIGATION                       |  |  |  |  |
|                               | PLANT ROOTS                      |  |  |  |  |
|                               | PLANT STRESS                     |  |  |  |  |
|                               | SOIL MOISTURE                    |  |  |  |  |
|                               | SOIL SCIENCE                     |  |  |  |  |
|                               | SOILS                            |  |  |  |  |
|                               | VEGETATIVE INDEX                 |  |  |  |  |
| VEGETATIVE INDEX              |                                  |  |  |  |  |
| 1303                          |                                  |  |  |  |  |
| RT                            | AGRICULTURE                      |  |  |  |  |
|                               | ATMOSPHERIC ATTENUATION          |  |  |  |  |
|                               | ATMOSPHERIC EFFECTS              |  |  |  |  |
|                               | ATMOSPHERIC OPTICS               |  |  |  |  |
|                               | ATMOSPHERIC SCATTERING           |  |  |  |  |
|                               | CANOPIES (VEGETATION)            |  |  |  |  |
|                               | COLOR                            |  |  |  |  |
|                               | CORRECTION                       |  |  |  |  |

CROP IDENTIFICATION  
CROP INVENTORIES  
IMAGE ENHANCEMENT  
IMAGING TECHNIQUES  
LEAF AREA INDEX  
MULTISPECTRAL BAND SCANNERS  
RADIOMETRIC CORRECTION  
REFLECTANCE  
REMOTE SENSING  
SATELLITE IMAGERY  
SATELLITE OBSERVATION  
SPECTRAL REFLECTANCE  
VEGETATION GROWTH

VEHICLE WHEELS  
O202 1504  
GS  
#VEHICLE WHEELS  
..NOSE WHEELS  
AIRCRAFT TIRES  
BRAKES (FOR ARRESTING MOTION)  
LANDING GEAR  
MECHANICAL DRIVES  
ROLLERS  
SHAFTS (MACHINE ELEMENTS)  
SUSPENSION SYSTEMS (VEHICLES)  
TIRES  
TOROIDAL WHEELS  
TRANSMISSIONS (MACHINE ELEMENTS)  
WHEEL BRAKES

% VEHICLES  
O201 1106 2102 2103 3103 3105 3110  
1504  
SN  
(USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
UF CRAFT  
ROTATING VEHICLES  
RT AMPHIBIOUS VEHICLES  
ARCAS ROCKET VEHICLES  
ARCON ROCKET VEHICLE  
ARGO ROCKET VEHICLES  
ASTROBEE ROCKET VEHICLES  
ATLAS AGENA LAUNCH VEHICLES  
ATLAS LAUNCH VEHICLES  
AUTOMATED GUIDEWAY TRANSIT VEHICLES  
AUTOMATED MIXED TRAFFIC VEHICLES  
AUTOMATED TRANSIT VEHICLES  
AUTOMOBILES  
% BALLISTIC VEHICLES  
BOOSTGLIDE VEHICLES  
CAPTURED AIR BUBBLE VEHICLES  
CONTROL CONFIGURED VEHICLES  
CRAWLER TRACTORS

DRONE VEHICLES  
ELECTRIC HYBRID VEHICLES  
ELECTRIC MOTOR VEHICLES  
ENGINES  
EUROPA LAUNCH VEHICLES  
FLIGHT TEST VEHICLES  
% FLIGHT VEHICLES  
GROUND EFFECT MACHINES  
HEAVY LIFT LAUNCH VEHICLES  
HOTOL LAUNCH VEHICLE  
HOVERING ROCKET VEHICLES  
HYDROPLANES (VEHICLES)  
HYPERSONIC VEHICLES  
INTRAORBIT TRANSFER VEHICLES  
JUNO LAUNCH VEHICLES  
KAPPA ROCKET VEHICLES  
LAMBDA ROCKET VEHICLES  
LAUNCH VEHICLES  
LOW OBSERVABLE REENTRY VEHICLES  
LUNAR FLYING VEHICLES  
LUNAR ROVING VEHICLES  
LUNAR SURFACE VEHICLES  
LUNOKHOD LUNAR ROVING VEHICLES  
MAGNETIC LEVITATION VEHICLES  
MANNED LUNAR SURFACE VEHICLES  
% MILITARY VEHICLES  
MISSILES  
MOTOR VEHICLES  
MULTIENGINE VEHICLES  
MULTISTAGE ROCKET VEHICLES  
NIKE ROCKET VEHICLES  
NIKE-HYDAC ROCKET VEHICLE  
NIKE-IRQUOIS ROCKET VEHICLE  
NOVA LAUNCH VEHICLES  
NUCLEAR ENGINE FOR ROCKET VEHICLES  
ORBIT TRANSFER VEHICLES  
RANGER LUNAR LANDING VEHICLES  
RECOVERABLE LAUNCH VEHICLES  
RECOVERY VEHICLES  
REENTRY VEHICLES  
REMOTELY PILOTED VEHICLES  
RESEARCH VEHICLES  
REUSABLE LAUNCH VEHICLES  
ROCKET VEHICLES  
ROVING VEHICLES  
SATURN LAUNCH VEHICLES  
SINGLE STAGE ROCKET VEHICLES  
SINGLE STAGE TO ORBIT VEHICLES  
SKUA ROCKET VEHICLES  
% SPACECRAFT  
STANDARD LAUNCH VEHICLES  
SURFACE EFFECT SHIPS  
SURFACE VEHICLES  
SWATH (SHIP)  
TANKS (COMBAT VEHICLES)

TERMINAL CONFIGURED VEHICLE PROGRAM  
TEST VEHICLES  
THOR LAUNCH VEHICLES  
THORAD LAUNCH VEHICLES  
TITAN LAUNCH VEHICLES  
TITAN 4 LAUNCH VEHICLE  
TRACKED VEHICLES  
TRACTORS  
% TRANSPORT VEHICLES  
TRANSPORTER  
UNDERWATER VEHICLES  
UNIDENTIFIED FLYING OBJECTS  
VERONIQUE ROCKET VEHICLES  
WATER VEHICLES  
% WINGED VEHICLES

VEHICULAR TRACKS  
O202  
RT IDLERS  
SURFACE VEHICLES  
SUSPENSION SYSTEMS (VEHICLES)  
TRACKED VEHICLES  
% TRACKS  
TREADS

VEINS  
O404  
GS ANATOMY  
.CIRCULATORY SYSTEM  
..CARDIOVASCULAR SYSTEM  
...BLOOD VESSELS  
...#VEINS  
ARTERIES  
RT BIFURCATION (BIOLOGY)  
TRANSFUSION

VELA SATELLITES  
3107  
GS ARTIFICIAL SATELLITES  
#VELA SATELLITES  
MILITARY SPACECRAFT  
#VELA SATELLITES  
RT FISHBOWL OPERATION  
HIGH ALTITUDE NUCLEAR DETECTION  
HIGH ALTITUDE TESTS  
NUCLEAR EXPLOSIONS  
NUCLEAR RADIATION  
POST-BLAST NUCLEAR RADIATION  
RADIATION DETECTORS  
RADIATION MEASURING INSTRUMENTS  
SATELLITE OBSERVATION  
VELARDENITE  
USE GEHLENITE

[illegible]

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..VENERA 2 SATELLITE
..VENERA 3 SATELLITE
..VENERA 4 SATELLITE
..VENERA 5 SATELLITE
..VENERA 6 SATELLITE
..VENERA 7 SATELLITE
..VENERA 8 SATELLITE
..VENERA 9 SATELLITE
..VENERA 10 SATELLITE
..VENERA 11 SATELLITE
..VENERA 12 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
..#VENERA SATELLITES
....VENERA 2 SATELLITE
....VENERA 3 SATELLITE
....VENERA 4 SATELLITE
....VENERA 5 SATELLITE
....VENERA 6 SATELLITE
....VENERA 7 SATELLITE
....VENERA 8 SATELLITE
....VENERA 9 SATELLITE
....VENERA 10 SATELLITE
....VENERA 11 SATELLITE
....VENERA 12 SATELLITE
U.S.S.R. SPACE PROGRAM
VEGA PROJECT

RT
VENERA 2 SATELLITE
3107 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 2 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 2 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 2 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 2 SATELLITE

VENERA 3 SATELLITE
3107 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 3 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 3 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 3 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 3 SATELLITE

VENERA 4 SATELLITE
3107 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 4 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 4 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 4 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 4 SATELLITE

VENERA 5 SATELLITE
3107 3108 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 5 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 5 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 5 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 5 SATELLITE

VENERA 6 SATELLITE
3107 3108 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 6 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 6 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 6 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 6 SATELLITE

VENERA 7 SATELLITE
3107 3108 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 7 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 7 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 7 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 7 SATELLITE

VENERA 8 SATELLITE
3107 3108 3409 3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
..#VENERA 8 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
..#VENERA 8 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
..VENERA 8 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...#VENERA SATELLITES
...VENERA 8 SATELLITE

RT
U.S.S.R. SPACE PROGRAM
VENUS (PLANET)

VENERA 9 SATELLITE

```

```

3009
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
...#VENERA 9 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
...#VENERA 9 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
.#VENERA 9 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...VENERA SATELLITES
...#VENERA 9 SATELLITE

VENERA 10 SATELLITE
3105 3007
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
...#VENERA 10 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
...#VENERA 10 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
.#VENERA 10 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES
...VENERA SATELLITES
...#VENERA 10 SATELLITE
RT U.S.S.R. SPACE PROGRAM
VENUS (PLANET)

VENERA 11 SATELLITE
3107 3007
GS
ARTIFICIAL SATELLITES
.SOVIET SATELLITES
..VENERA SATELLITES
...#VENERA 11 SATELLITE
INTERPLANETARY SPACECRAFT
.VENUS PROBES
..VENERA SATELLITES
...#VENERA 11 SATELLITE
SOVIET SPACECRAFT
.VENERA SATELLITES
.#VENERA 11 SATELLITE
UNMANNED SPACECRAFT
.SPACE PROBES
..VENUS PROBES

```

## 1555

RELEASING  
RELIEF VALVES  
% SEPARATION  
VENTILATION  
VENTS

VENTRAL SECTIONS  
0404  
RT ABDOMEN

VENTS  
0101 0104 1203 3501  
GS OUTLETS  
#VENTS  
RT ANNULAR DUCTS  
APERTURES  
CAVITIES  
CHIMNEYS  
COOLING SYSTEMS  
DUCTS  
EVACUATING (VACUUM)  
EXHAUST SYSTEMS  
FLUES  
GATES (OPENINGS)  
LOUVERS  
% NOZZLES  
OPENINGS  
PORTS (OPENINGS)  
RELIEF VALVES  
SLOTTED WIND TUNNELS  
VENTILATION  
VENTILATORS  
VENTING  
WINDOWS (APERTURES)

VENTURI TUBES  
1202 1203 1204  
RT % DETECTORS  
FLOW MEASUREMENT  
FLOWMETERS  
GAS METERS  
MEASURING INSTRUMENTS  
ORIFICES  
PITOT TUBES  
PRESSURE GRADIENTS  
PRESSURE MEASUREMENT  
% TUBES  
VELOCITY MEASUREMENT

VENUS (PLANET)  
3008  
GS CELESTIAL BODIES  
.PLANETS  
..TERRESTRIAL PLANETS  
...#VENUS (PLANET)

RT PLANETARY CRATERS  
VEGA PROJECT  
VENERA 8 SATELLITE  
VENERA 10 SATELLITE  
VENERA 11 SATELLITE  
VENERA 12 SATELLITE

VENUS ATMOSPHERE  
3007 3008 3009  
GS ENVIRONMENTS  
.EXTRATERRESTRIAL ENVIRONMENTS  
..PLANETARY ENVIRONMENTS  
...PLANETARY ATMOSPHERES  
...#VENUS ATMOSPHERE  
....VENUS CLOUDS  
AEROSPACE ENVIRONMENTS  
IONOPAUSE  
PLANETARY IONOSPHERES  
PLANETARY METEOROLOGY  
VENERA 11 SATELLITE  
VENERA 12 SATELLITE  
VENUS ORBITING IMAGING RADAR  
(SPACECRAFT)

RT VENUS CLOUDS  
2001 3007  
GS ENVIRONMENTS  
.EXTRATERRESTRIAL ENVIRONMENTS  
..PLANETARY ENVIRONMENTS  
...PLANETARY ATMOSPHERES  
....VENUS ATMOSPHERE  
....#VENUS CLOUDS  
ATMOSPHERIC MODELS  
CLOUD COVER  
CLOUD PHYSICS  
% CLOUDS  
GREENHOUSE EFFECT

VENUS FLY TRAP ROCKET VEHICLE  
3106 3108  
GS ROCKET VEHICLES  
.SOUNDING ROCKETS  
#VENUS FLY TRAP ROCKET VEHICLE  
RT COSMIC DUST  
EXTRATERRESTRIAL MATTER

VENUS ORBITING IMAGING RADAR (SPACECRAFT)  
3110 3007  
GS RADAR  
#VENUS ORBITING IMAGING RADAR  
(SPACECRAFT)  
RT MAGELLAN PROJECT (NASA)  
MAGELLAN SPACECRAFT (NASA)  
SYNTHETIC APERTURE RADAR  
VENUS ATMOSPHERE

VENUS PROBES  
3007 3108 3409  
GS INTERPLANETARY SPACECRAFT  
#VENUS PROBES  
..MAGELLAN SPACECRAFT (NASA)  
...MARINER 1 SPACE PROBE  
...MARINER 2 SPACE PROBE  
...MARINER 5 SPACE PROBE  
...MARINER 10 SPACE PROBE  
...PIONEER VENUS 2 SPACECRAFT  
...PIONEER VENUS 2 TRANSPORTER BUS  
...VENERA SATELLITES  
...VENERA 2 SATELLITE  
...VENERA 3 SATELLITE  
...VENERA 4 SATELLITE  
...VENERA 5 SATELLITE  
...VENERA 6 SATELLITE  
...VENERA 7 SATELLITE  
...VENERA 8 SATELLITE  
...VENERA 9 SATELLITE  
...VENERA 10 SATELLITE  
...VENERA 11 SATELLITE  
...VENERA 12 SATELLITE  
...ZOND 1 SPACE PROBE  
...ZOND 3 SPACE PROBE  
...ZOND 4 SPACE PROBE  
...ZOND 5 SPACE PROBE  
...ZOND 6 SPACE PROBE  
...ZOND 7 SPACE PROBE  
...ZOND 8 SPACE PROBE  
UNMANNED SPACECRAFT  
.SPACE PROBES  
.#VENUS PROBES  
...MAGELLAN SPACECRAFT (NASA)  
...MARINER 1 SPACE PROBE  
...MARINER 2 SPACE PROBE  
...MARINER 5 SPACE PROBE  
...MARINER 10 SPACE PROBE  
...VENERA SATELLITES  
...VENERA 2 SATELLITE  
...VENERA 3 SATELLITE  
...VENERA 4 SATELLITE  
...VENERA 5 SATELLITE  
...VENERA 6 SATELLITE  
...VENERA 7 SATELLITE  
...VENERA 8 SATELLITE  
...VENERA 9 SATELLITE  
...VENERA 10 SATELLITE  
...VENERA 11 SATELLITE  
...VENERA 12 SATELLITE  
...ZOND 1 SPACE PROBE  
...ZOND 3 SPACE PROBE

# NASA THESAURUS HIERARCHICAL UPDATE

...ZOND 4 SPACE PROBE  
 ...ZOND 5 SPACE PROBE  
 ...ZOND 6 SPACE PROBE  
 ...ZOND 7 SPACE PROBE  
 ...ZOND 8 SPACE PROBE  
 RT MAGELLAN PROJECT (NASA)  
 MARINER PROGRAM  
 MARINER VENUS 67 SPACECRAFT  
 MARS PROBES  
 OUTER PLANETS EXPLORERS  
 SPUTNIK 5 SATELLITE  
 VENUS ORBITING IMAGING RADAR  
 (SPACECRAFT)  
 VOYAGER PROJECT

VENUS RADAR ECHOES  
 0705 0710 3001 3003  
 GS ECHOES  
 .RADAR ECHOES  
 .#VENUS RADAR ECHOES

VENUS RADAR MAPPER  
 USE MAGELLAN SPACECRAFT (NASA)

VENUS RADAR MAPPER PROJECT  
 USE MAGELLAN PROJECT (NASA)

VENUS SURFACE  
 3008  
 GS PLANETARY SURFACES  
 #VENUS SURFACE  
 RT CLOUD COVER  
 EXTRATERRESTRIAL ENVIRONMENTS  
 MAGELLAN PROJECT (NASA)  
 MAGELLAN SPACECRAFT (NASA)  
 PLANETARY CRATERS  
 SOLAR SYSTEM  
 % SURFACES  
 TERRAFORMING  
 TOPOGRAPHY  
 VENERA 11 SATELLITE  
 VENERA 12 SATELLITE  
 VENUS ORBITING IMAGING RADAR  
 (SPACECRAFT)

VERBAL COMMUNICATION  
 0404 0702  
 GS COMMUNICATING  
 #VERBAL COMMUNICATION  
 ..CONVERSATION  
 RT ACOUSTICS  
 LANGUAGES  
 LECTURES  
 PHONETICS  
 TELEPHONY

VOICE COMMUNICATION  
 VOICE DATA PROCESSING  
 WORDS (LANGUAGE)

VERIFICATION (PROVING)  
 USE PROVING

VERMICULITE  
 1806 3305  
 GS CLAYS  
 #VERMICULITE  
 MINERALS  
 #VERMICULITE  
 RT INSULATION  
 MICA  
 PACKAGING  
 SILICATES

VERMONT  
 1305  
 GS NATIONS  
 .UNITED STATES  
 .#VERMONT  
 RT LAKE CHAMPLAIN BASIN (NY-VT)  
 ST LAWRENCE VALLEY (NORTH AMERICA)

VERNEUIL PROCESS  
 1601 2601  
 GS GROWTH  
 .CRYSTAL GROWTH  
 .#VERNEUIL PROCESS  
 RT CZOCHRALSKI METHOD  
 RUBY LASERS

VERNIER ENGINES  
 2802 2806 2808  
 GS ENGINES  
 .ROCKET ENGINES  
 .#VERNIER ENGINES  
 ...SYNCOM APOGEE ENGINES  
 .TORPEDO ENGINES  
 .#VERNIER ENGINES  
 ...CONTROL ROCKETS  
 ...SYNCOM APOGEE ENGINES  
 ELECTRIC ROCKET ENGINES  
 ELECTROSTATIC ENGINES  
 HYBRID PROPELLANT ROCKET ENGINES  
 INTERNAL COMBUSTION ENGINES  
 LAUNCH VEHICLES  
 LIQUID PROPELLANT ROCKET ENGINES  
 MA-2 ENGINE  
 MA-3 ENGINE  
 MA-5 ENGINE  
 MICROROCKET ENGINES  
 RESTARTABLE ROCKET ENGINES

SOLID PROPELLANT ROCKET ENGINES  
 THRUST VECTOR CONTROL

VERGINE  
 USE GUANOSINES

VERONIQUE ROCKET VEHICLES  
 3106 3108  
 GS ROCKET VEHICLES  
 .SINGLE STAGE ROCKET VEHICLES  
 .#VERONIQUE ROCKET VEHICLES  
 .SOUNDING ROCKETS  
 .#VERONIQUE ROCKET VEHICLES  
 RT LIQUID PROPELLANT ROCKET ENGINES  
 % VEHICLES

VERSATILITY  
 3408  
 RT COMPATIBILITY  
 FLEXIBILITY

VERTEBRAE  
 0402 0404  
 GS ANATOMY  
 .MUSCULOSKELETAL SYSTEM  
 ..BONES  
 ...SPINE  
 ...#VERTEBRAE  
 RT INTERVERTEBRAL DISKS  
 NECK (ANATOMY)

VERTEBRAL COLUMN  
 USE SPINE

VERTEBRATES  
 0402 0404  
 GS ANIMALS  
 #VERTEBRATES  
 ..AMPHIBIA  
 ...FROGS  
 ...BIRDS  
 ...CHICKENS  
 ...PIGEONS  
 ...TURKEYS  
 ...WATERFOWL  
 ...FISHES  
 ...SCHOOLS (FISH)  
 ...SHARKS  
 ...MAMMALS  
 ...BATS  
 ...BEARS  
 ...CATS  
 ...CATTLE  
 ...CALVES  
 ...DEER

|                           |                                            |                                  |
|---------------------------|--------------------------------------------|----------------------------------|
| ...CARIBOUS               | VERTICAL ATTITUDE TAKEOFF-LANDING AIRCRAFT | VERTICAL LANDING                 |
| ...DOGS                   | USE VATOL AIRCRAFT                         | O209                             |
| ...GOATS                  |                                            | UF                               |
| ...HORSES                 |                                            | VTOL                             |
| ...MARINE MAMMALS         | VERTICAL DISTRIBUTION                      | GS                               |
| ...DOLPHINS               | 1902 1905 2003                             | LANDING                          |
| ...MANATEES               | GS DISTRIBUTION (PROPERTY)                 | #VERTICAL LANDING                |
| ...PORPOISES              | #VERTICAL DISTRIBUTION                     | RT                               |
| ...SEALS (ANIMALS)        | ..STAR DISTRIBUTION                        | AIRCRAFT LANDING                 |
| ...WHALES                 | ELECTRON DISTRIBUTION                      | STOVL AIRCRAFT                   |
| ...MOLES                  | HORIZONTAL DISTRIBUTION                    | TOUCHDOWN                        |
| ...PRIMATES               | ION DISTRIBUTION                           | VATOL AIRCRAFT                   |
| ...APES                   | PRESSURE DISTRIBUTION                      |                                  |
| ...CHIMPANZEES            | RADIATION DISTRIBUTION                     | VERTICAL MOTION                  |
| ...BABOONS                | SPATIAL DISTRIBUTION                       | 1308 2308                        |
| ...HUMAN BEINGS           | TEMPERATURE DISTRIBUTION                   | RT                               |
| ...MONKEYS                | WIND PROFILES                              | FALLING                          |
| ...RODENTS                |                                            | % MOTION                         |
| ...GUINEA PIGS            |                                            | TOUCHDOWN                        |
| ...HAMSTERS               | VERTICAL FINS                              |                                  |
| ...MICE                   | USE FINS                                   | VERTICAL MOTION SIMULATORS       |
| ...JERBOAS                | VERTICAL FLIGHT                            | 1902                             |
| ...POCKET MICE            | O209 3006 3110                             | GS                               |
| ...RABBITS                | RT BALLOON FLIGHT                          | SIMULATORS                       |
| ...RATS                   | CLIMBING FLIGHT                            | .VIBRATION SIMULATORS            |
| ...SQUIRRELS              | % FLIGHT                                   | ..#VERTICAL MOTION SIMULATORS    |
| ...GROUND SQUIRRELS       | FLIGHT PATHS                               | RT % MOTION                      |
| ...SHEEP                  | HOVERING                                   | SHAKERS                          |
| ...SWINE                  | ROCKET FLIGHT                              | SHOCK SIMULATORS                 |
| ...WOLVES                 | TRANSITION FLIGHT                          | VIBRATORY LOADS                  |
| ...REPTILES               | V/STOL AIRCRAFT                            |                                  |
| ...LIZARDS                |                                            | VERTICAL ORIENTATION             |
| ...SNAKES                 | VERTICAL JUNCTION SOLAR CELLS              | O502                             |
| ...TURTLES                | O902                                       | RT                               |
| HOMEOTHERMS               | GS ELECTRIC GENERATORS                     | ALIGNMENT                        |
|                           | .DIRECT POWER GENERATORS                   | ATTITUDE (INCLINATION)           |
|                           | ..PHOTOELECTRIC GENERATORS                 | DIRECTIONAL STABILITY            |
|                           | ...PHOTOVOLTAIC CELLS                      | DYNAMIC STABILITY                |
|                           | ....SOLAR CELLS                            | HORIZONTAL ORIENTATION           |
|                           | ...#VERTICAL JUNCTION SOLAR CELLS          | LATERAL STABILITY                |
|                           | .SOLAR GENERATORS                          | % ORIENTATION                    |
|                           | ..SOLAR CELLS                              | STABILIZATION                    |
|                           | ...#VERTICAL JUNCTION SOLAR CELLS          | VERTICAL PERCEPTION              |
|                           | .SOLAR CELLS                               | O408                             |
|                           | ..#VERTICAL JUNCTION SOLAR CELLS           | GS                               |
|                           | ELECTRONIC EQUIPMENT                       | PERCEPTION                       |
|                           | SOLID STATE DEVICES                        | .SENSORY PERCEPTION              |
|                           | ..SEMICONDUCTOR DEVICES                    | ..#VERTICAL PERCEPTION           |
|                           | ...PHOTOVOLTAIC CELLS                      | RT                               |
|                           | ....SOLAR CELLS                            | BODY SWAY TEST                   |
|                           | ...#VERTICAL JUNCTION SOLAR CELLS          | GRAVIRECEPTORS                   |
|                           | PHOTOELECTRIC CELLS                        | OCULOGRAPHIC ILLUSIONS           |
|                           | PHOTOVOLTAIC CELLS                         | % ORIENTATION                    |
|                           | ..SOLAR CELLS                              | OTOLITH ORGANS                   |
|                           | ...#VERTICAL JUNCTION SOLAR CELLS          | % SPACE ORIENTATION              |
|                           | PHOTOVOLTAIC CELLS                         | VESTIBULAR TESTS                 |
|                           | ..SOLAR CELLS                              |                                  |
|                           | ...#VERTICAL JUNCTION SOLAR CELLS          | VERTICAL STABILIZERS             |
|                           | RT WAFERS                                  | USE STABILIZERS (FLUID DYNAMICS) |
| VERTICAL AIR CURRENTS     |                                            |                                  |
| 1301 1302 2001 2003       |                                            |                                  |
| UF UPDRAFTS               |                                            |                                  |
| GS FLUID FLOW             |                                            |                                  |
| .GAS FLOW                 |                                            |                                  |
| ..AIR FLOW                |                                            |                                  |
| ...AIR CURRENTS           |                                            |                                  |
| ...#VERTICAL AIR CURRENTS |                                            |                                  |
| ATMOSPHERIC CIRCULATION   |                                            |                                  |
| CONVECTION CLOUDS         |                                            |                                  |
| CONVECTION CURRENTS       |                                            |                                  |
| DOWNBURSTS                |                                            |                                  |
| LEE WAVES                 |                                            |                                  |
| MICROBURSTS (METEOROLOGY) |                                            |                                  |
| MIXING HEIGHT             |                                            |                                  |
| SOARING                   |                                            |                                  |
| TURBULENCE                |                                            |                                  |
| WIND (METEOROLOGY)        |                                            |                                  |



# NASA THESAURUS HIERARCHICAL UPDATE

## VERTICAL TAILS

USE STABILIZERS (FLUID DYNAMICS)  
TAIL ASSEMBLIES

## VERTICAL TAKEOFF

O201 0209 3102  
UF VERTICAL TAKEOFF AND LANDING  
VTOL

## GS TAKEOFF

#VERTICAL TAKEOFF

## VERTICAL TAKEOFF AIRCRAFT

O209  
UF VTOL AIRCRAFT

GS V/STOL AIRCRAFT

#VERTICAL TAKEOFF AIRCRAFT

..FLYING PLATFORMS

..SC-1 AIRCRAFT

..VJ-101 AIRCRAFT

..VZ-8 AIRCRAFT

..X-13 AIRCRAFT

..X-14 AIRCRAFT

..X-19 AIRCRAFT

..X-22 AIRCRAFT

..X-22A AIRCRAFT

..XC-142 AIRCRAFT

..XV-4 AIRCRAFT

..XV-11A AIRCRAFT

RT % AIRCRAFT

BELL 214A HELICOPTER

CF-700 ENGINE

CIRCULATION CONTROL ROTORS

COMPOUND HELICOPTERS

CONVERTIBLE FAN-SHAFT ENGINES

CUSHIONCRAFT GROUND EFFECT MACHINE

FAN IN WING AIRCRAFT

GETOL AIRCRAFT

HELICOPTERS

LIFT FANS

LIFTING ROTORS

% MILITARY AIRCRAFT

POWERED LIFT AIRCRAFT

RESEARCH AIRCRAFT

ROTARY WING AIRCRAFT

SHORT TAKEOFF AIRCRAFT

% SUBSONIC AIRCRAFT

T-58 ENGINE

T-58-GE-8B ENGINE

TILT WING AIRCRAFT

VATOL AIRCRAFT

% WINGED VEHICLES

VERTICAL TAKEOFF AND LANDING

USE VERTICAL LANDING

VERTICAL TAKEOFF

## VERTICAL 8 ROCKET

3105

GS ROCKET VEHICLES

.SOUNDING ROCKETS

.#VERTICAL 8 ROCKET

RT PAYLOADS

% ROCKETS

## VERTICES

USE APEXES

## VERTIGO

O401 O405 O408

GS SIGNS AND SYMPTOMS

#VERTIGO

RT BARANY CHAIR

EAR PRESSURE TEST

VESTIBULAR TESTS

## VERTOL MILITARY HELICOPTERS

USE BOEING AIRCRAFT

## VERY HIGH FREQUENCIES

O702 0710 2309 2312 2402

SN (30 TO 300 MHZ)

GS FREQUENCIES

.RADIO FREQUENCIES

.#VERY HIGH FREQUENCIES

...P BAND

RT DECAHMETRIC WAVES

LOW FREQUENCY BANDS

MAXIMUM USABLE FREQUENCY

## VERY HIGH FREQUENCY RADIO EQUIPMENT

O701 0705 0710 2402

UF ULTRA SHORT WAVE RADIO EQUIPMENT

GS RADIO EQUIPMENT

.#VERY HIGH FREQUENCY RADIO

EQUIPMENT

RT RADIO ASTRONOMY

ULTRAHIGH FREQUENCIES

## VERY HIGH SPEED INTEGRATED CIRCUITS

USE VHSIC (CIRCUITS)

## VERY LARGE ARRAY (VLA)

O705 1412 2402 3001

GS RADIO EQUIPMENT

.RADIO TELESCOPES

.#VERY LARGE ARRAY (VLA)

TELESCOPES

.RADIO TELESCOPES

.#VERY LARGE ARRAY (VLA)

RT

ANTENNA ARRAYS

## RADIO ASTRONOMY

## VERY LARGE SCALE INTEGRATION

O902

UF

GS

CIRCUITS

.INTEGRATED CIRCUITS

.#VERY LARGE SCALE INTEGRATION

MICROELECTRONICS

#VERY LARGE SCALE INTEGRATION

APPLICATION SPECIFIC INTEGRATED

CIRCUITS

ARCHITECTURE (COMPUTERS)

CHIPS (ELECTRONICS)

HARDWARE DESCRIPTION LANGUAGES

LARGE SCALE INTEGRATION

MOLECULAR ELECTRONICS

SYSTOLIC ARRAYS

## VERY LONG BASE INTERFEROMETRY

2310 3009

UF VLBI

GS INTERFEROMETRY

.#VERY LONG BASE INTERFEROMETRY

ASTRONOMICAL INTERFEROMETRY

DIFFRACTION PATTERNS

ETALONS

INTERFEROMETERS

NULL ZONES

QUASAT

RADIO ASTRONOMY

RADIO INTERFEROMETERS

VERY LONG BASELINE ARRAY (VLBA)

## VERY LONG BASELINE ARRAY (VLBA)

O705 1412 2402 3001

GS

RADIO EQUIPMENT

.RADIO TELESCOPES

.#VERY LONG BASELINE ARRAY (VLBA)

TELESCOPES

.RADIO TELESCOPES

.#VERY LONG BASELINE ARRAY (VLBA)

ANTENNA ARRAYS

RADIO ASTRONOMY

VERY LONG BASE INTERFEROMETRY

## VERY LOW FREQUENCIES

O710 2309 2402

SN (3 TO 30 KHZ)

GS FREQUENCIES

.RADIO FREQUENCIES

..LOW FREQUENCIES

..#VERY LOW FREQUENCIES

..LOW FREQUENCY BANDS

..#VERY LOW FREQUENCIES

RT AUDIO FREQUENCIES  
EARTH-IONOSPHERE WAVEGUIDE  
USE VSAT (NETWORK)  
VERY SMALL APERTURE TERMINALS  
USE VSAT (NETWORK)  
VESSELS  
1103 1106 1108 1502 1504  
SN (USE OF A MORE SPECIFIC TERM IS  
RECOMMENDED--CONSULT THE TERMS  
LISTED BELOW)  
RT BLOOD VESSELS  
% CAPSULES  
FLUID FILLED SHELLS  
LIQUID FILLED SHELLS  
NAVY  
PRESSURE VESSELS  
SHIPS  
VESTA ASTEROID  
1901 3001 3008  
GS CELESTIAL BODIES  
.ASTEROID BELTS  
.ASTEROIDS  
..#VESTA ASTEROID  
RT METEORIDS  
SOLAR SYSTEM  
SPACE DEBRIS  
VESTIBULAR NYSTAGMUS  
O404 0405  
GS EYE MOVEMENTS  
.NYSTAGMUS  
.#VESTIBULAR NYSTAGMUS  
REFLEXES  
#VESTIBULAR NYSTAGMUS  
RT ANATOMY  
EYE (ANATOMY)  
OPHTHALMOLOGY  
VESTIBULAR TESTS  
O401 0501 0502  
GS PHYSIOLOGICAL TESTS  
#VESTIBULAR TESTS  
RT BODY SWAY TEST  
CORIOLIS EFFECT  
EAR PRESSURE TEST  
HEAD DOWN TILT  
HEAD MOVEMENT  
VERTICAL PERCEPTION  
VERTIGO  
VESTIBULES  
O404 0408  
GS ANATOMY  
.SENSE ORGANS  
..EAR  
...LABYRINTH  
...#VESTIBULES  
RT MORPHOLOGY  
PASSAGEWAYS  
SEMICIRCULAR CANALS  
VESTS  
O508  
RT CLOTHING  
GARMENTS  
VETERINARY MEDICINE  
O401  
RT % BIOLOGY  
DIAGNOSIS  
DISEASES  
EPIDEMIOLOGY  
IMMUNOLOGY  
INJURIES  
% MEDICINE  
PATHOLOGY  
PHARMACOLOGY  
SURGERY  
VFR (RULES)  
USE VISUAL FLIGHT RULES  
VHDL (COMPUTERS)  
USE HARDWARE DESCRIPTION LANGUAGES  
VHF OMNIRANGE NAVIGATION  
O702 0705 0709 2102 2402  
UF OMNIRANGE NAVIGATION  
VOR SYSTEMS  
GS NAVIGATION  
.RADIO NAVIGATION  
.#VHF OMNIRANGE NAVIGATION  
RT AIR NAVIGATION  
NAVIGATION AIDS  
RADIO DIRECTION FINDERS  
SOLAR COMPASSES  
VHSIC (CIRCUITS)  
O902  
UF VERY HIGH SPEED INTEGRATED CIRCUITS  
GS CIRCUITS  
.INTEGRATED CIRCUITS  
.#VHSIC (CIRCUITS)  
RT CHIPS (ELECTRONICS)  
LARGE SCALE INTEGRATION  
SIGNAL PROCESSING  
VIABILITY  
O401 0404 0405 0507  
RT ANIMALS  
CARBON CYCLE  
CROP VIGOR  
GERMINATION  
GROWTH  
PLANTS (BOTANY)  
SEEDS  
VIBRATION  
O101 0506 1308 2311 3009 3407  
UF JITTER  
GS #VIBRATION  
.COMBUSTION VIBRATION  
.FORCED VIBRATION  
.FREE VIBRATION  
.LATTICE VIBRATIONS  
.POGO EFFECTS  
.RANDOM VIBRATION  
.RESONANT VIBRATION  
.STRUCTURAL VIBRATION  
..BENDING VIBRATION  
..BREATHING VIBRATION  
..FLUTTER  
...PANEL FLUTTER  
...SUBSONIC FLUTTER  
...SUPERSONIC FLUTTER  
...TRANSONIC FLUTTER  
..LINEAR VIBRATION  
..MISSILE VIBRATION  
..SELF INDUCED VIBRATION  
..PANEL FLUTTER  
...SUBSONIC FLUTTER  
...SUPERSONIC FLUTTER  
...TRANSONIC FLUTTER  
..TORSIONAL VIBRATION  
ACUSTICS  
AIRFOIL OSCILLATIONS  
AMPLITUDES  
ANTINODES  
COMPACTING  
CYCLIC LOADS  
DISPLACEMENT  
% DYNAMICS  
ELASTIC WAVES  
FATIGUE (MATERIALS)  
FLAPPING  
HARMONICS  
ISOLATORS  
MECHANICAL OSCILLATORS  
MECHANICAL SHOCK  
MISTUNING (TURBOMACHINERY)  
MODES (STANDING WAVES)  
% MOTION  
NODES (STANDING WAVES)

# NASA THESAURUS HIERARCHICAL UPDATE

|                           |                               |                                        |
|---------------------------|-------------------------------|----------------------------------------|
| NUTATION                  | NOISE REDUCTION               | % MACHINERY                            |
| OSCILLATING CYLINDERS     | OSCILLATION DAMPERS           | SHAKERS                                |
| OSCILLATIONS              | SHOCK ABSORBERS               | SHOCK SIMULATORS                       |
| OSCILLATORS               | SPRINGS (ELASTIC)             | VIBRATORY LOADS                        |
| RESONANCE                 | SUSPENSION SYSTEMS (VEHICLES) |                                        |
| SHAKING                   |                               |                                        |
| SHOCK RESISTANCE          | VIBRATION MEASUREMENT         | VIBRATION TESTING MACHINES             |
| SPACECRAFT MOTION         | O501 1406 3203 3501           | USE VIBRATION SIMULATORS               |
| STANDING WAVES            | GS MECHANICAL MEASUREMENT     |                                        |
| VIBRATIONAL STRESS        | RT #VIBRATION MEASUREMENT     | VIBRATION TESTS                        |
| VIBRATORY LOADS           | DAMPING TESTS                 | 1106 1108 1505 3203 3501               |
| VIBRATORY POLISHING       | FREQUENCY ANALYZERS           | GS #VIBRATION TESTS                    |
| % WAVES                   | FREQUENCY MEASUREMENT         | .DAMPING TESTS                         |
| WING OSCILLATIONS         | STRESS MEASUREMENT            | ..STROKING TESTS                       |
|                           |                               | RT DESTRUCTIVE TESTS                   |
| VIBRATION DAMPERS         |                               | DYNAMIC TESTS                          |
| USE VIBRATION ISOLATORS   |                               | ELECTRONIC EQUIPMENT TESTS             |
|                           |                               | ENGINE TESTS                           |
| VIBRATION DAMPING         | VIBRATION METERS              | ENVIRONMENTAL TESTS                    |
| 1504 2308 3203            | O501 1406 3203 3501           | FLIGHT TESTS                           |
| GS DAMPING                | UF VIBROMETERS                | FLUTTER                                |
| RT #VIBRATION DAMPING     | GS MEASURING INSTRUMENTS      | MECHANICAL ENGINEERING                 |
| ACOUSTICS                 | #VIBRATION METERS             | OSCILLATIONS                           |
| ATTENUATION               | ..SEISMOGRAPHS                | RESONANCE TESTING                      |
| DAST PROGRAM              | ...LUNAR SEISMOGRAPHS         | SHOCK TESTS                            |
| ELASTIC DAMPING           | RT ACCELEROMETERS             | STABILITY TESTS                        |
| FLEXIBLE SPACECRAFT       | TRANSDUCERS                   | STATIC TESTS                           |
| GYRODAMPERS               |                               | STRUCTURAL VIBRATION                   |
| HARMONIC CONTROL          | VIBRATION MODE                | % TESTS                                |
| MOLECULAR RELAXATION      | O710 2308 3203                |                                        |
| NONOSCILLATORY ACTION     | UF MODE OF VIBRATION          | VIBRATIONAL FREEZING                   |
| NONSTABILIZED OSCILLATION | GS MODES                      | 2301 2302 2312                         |
| SHOCK ABSORBERS           | #VIBRATION MODE               | GS PHASE TRANSFORMATIONS               |
|                           | ..UNCOUPLED MODES             | .FREEZING                              |
|                           | RT AIRFOIL OSCILLATIONS       | ..#VIBRATIONAL FREEZING                |
|                           | FREE VIBRATION                |                                        |
|                           | LINEAR VIBRATION              | VIBRATIONAL FREQUENCIES (MOLECULAR)    |
|                           | MODE TRANSFORMERS             | USE VIBRATIONAL SPECTRA                |
|                           | TRANSVERSE WAVES              |                                        |
|                           |                               | VIBRATIONAL FREQUENCIES (STRUCTURAL)   |
|                           | VIBRATION PERCEPTION          | USE RESONANT FREQUENCIES               |
|                           | O401 O408                     |                                        |
|                           | GS PERCEPTION                 | VIBRATIONAL RELAXATION                 |
|                           | .SENSORY PERCEPTION           | USE MOLECULAR RELAXATION               |
|                           | ..#VIBRATION PERCEPTION       |                                        |
|                           |                               | VIBRATIONAL SPECTRA                    |
|                           | VIBRATION PROTECTION          | 1411 2306 2402 2601                    |
|                           | USE VIBRATION ISOLATORS       | UF VIBRATIONAL FREQUENCIES (MOLECULAR) |
|                           |                               | GS SPECTRA                             |
|                           | VIBRATION SIMULATORS          | .MOLECULAR SPECTRA                     |
|                           | 1107 1108 3203 3501           | ..#VIBRATIONAL SPECTRA                 |
|                           | UF VIBRATION TESTING MACHINES | .RADIATION SPECTRA                     |
|                           | GS SIMULATORS                 | ..ELECTROMAGNETIC SPECTRA              |
|                           | #VIBRATION SIMULATORS         | ..#VIBRATIONAL SPECTRA                 |
|                           | ..VERTICAL MOTION SIMULATORS  | ELECTRONIC SPECTRA                     |
|                           | RT FLUTTER                    | ENERGY SPECTRA                         |

MOLECULAR RELAXATION  
 RAMAN SPECTRA  
 ROTATIONAL SPECTRA  
 VIBRATIONAL STATES

VIBRATIONAL STATES  
 2311 2404  
 SN (LIMITED TO MOLECULAR ENERGY  
 LEVELS - EXCLUDES VIBRATION  
 MODES/CONDITIONS OF STRUCTURES OR  
 VEHICLES)  
 GS LEVEL (QUANTITY)  
 .ENERGY LEVELS  
 ..MOLECULAR ENERGY LEVELS  
 ..#VIBRATIONAL STATES  
 RT MOLECULAR EXCITATION  
 VIBRATIONAL SPECTRA

VIBRATIONAL STRESS  
 O101 O102 O404 O408 3203  
 GS STRESSES  
 #VIBRATIONAL STRESS  
 RT FLUTTER  
 VIBRATION  
 VIBRATION EFFECTS  
 VIBRATORY LOADS

VIBRATORY LOADS  
 O101 1704 3203  
 GS LOADS (FORCES)  
 .DYNAMIC LOADS  
 .#VIBRATORY LOADS  
 RT AERODYNAMIC LOADS  
 CYCLIC LOADS  
 STRUCTURAL DESIGN CRITERIA  
 VERTICAL MOTION SIMULATORS  
 VIBRATION  
 VIBRATION SIMULATORS  
 VIBRATIONAL STRESS

VIBRATORY POLISHING  
 1504 1507  
 GS POLISHING  
 #VIBRATORY POLISHING  
 RT METALLOGRAPHY  
 VIBRATION

VIBROCARDIOGRAPHY  
 USE PHONOCARDIOGRAPHY

VIBROMETERS  
 USE VIBRATION METERS

VIC METHOD  
 USE VORTEX IN CELL TECHNIQUE

VICKERS SCIMITAR AIRCRAFT  
 USE SCIMITAR AIRCRAFT

VICKERS VALIANT AIRCRAFT  
 USE VALIANT AIRCRAFT

VICKERS VC-10 AIRCRAFT  
 USE VC-10 AIRCRAFT

VICKERS 1100 AIRCRAFT  
 USE VC-10 AIRCRAFT

VICTOR MK-1 AIRCRAFT  
 O207  
 GS ATTACK AIRCRAFT  
 .BOMBER AIRCRAFT  
 .#VICTOR MK-1 AIRCRAFT  
 HANDLEY PAGE AIRCRAFT  
 #VICTOR MK-1 AIRCRAFT  
 JET AIRCRAFT  
 #VICTOR MK-1 AIRCRAFT  
 MONOPLANES  
 #VICTOR MK-1 AIRCRAFT  
 RECONNAISSANCE AIRCRAFT  
 #VICTOR MK-1 AIRCRAFT  
 RT % AIRCRAFT

VIDEO COMMUNICATION  
 O404 O702 O709 2306 2310  
 GS TELECOMMUNICATION  
 #VIDEO COMMUNICATION  
 RT HIGH DEFINITION TELEVISION  
 MULTIMEDIA  
 TELEVISION SYSTEMS  
 VIDEO SIGNALS

VIDEO COMPRESSION  
 UF COMPRESSED VIDEO

VIDEO DATA  
 O702 O703 O708 0802 3405 9001  
 RT ANALOG DATA  
 % DATA  
 DATA CONVERTERS  
 DATA TRANSMISSION  
 DIGITAL DATA  
 DISPLAY DEVICES  
 HIGH DEFINITION TELEVISION  
 MULTIMEDIA  
 RADAR DATA  
 SMEAR  
 TELECOMMUNICATION  
 TELEVISION SYSTEMS  
 VIDEO DISKS

VIDEO SIGNALS

VIDEO DISKS  
 O803 9001  
 GS DOCUMENTS  
 .RECORDS  
 .#VIDEO DISKS  
 DATA RECORDERS  
 DATA RECORDING  
 DATA STORAGE  
 DISKS (SHAPES)  
 MAGNETIC DISKS  
 MEMORY (COMPUTERS)  
 OPTICAL DATA STORAGE MATERIALS  
 OPTICAL DISKS  
 OPTICAL MEMORY (DATA STORAGE)  
 PLAYBACKS  
 VIDEO DATA  
 VIDEO EQUIPMENT

VIDEO EQUIPMENT  
 O701 O702 O905 9001  
 GS #VIDEO EQUIPMENT  
 .PICTURE TUBES  
 .VIDEO TAPE RECORDERS  
 RT ADVANCED VIDICON CAMERA SYSTEM  
 (AVCS)  
 AUDIO VISUAL EQUIPMENT  
 CAMERA TUBES  
 CATHODE RAY TUBES  
 COMPENSATORS  
 DISPLAY DEVICES  
 FLYING SPOT SCANNERS  
 MOTION PICTURES  
 OPTICAL EQUIPMENT  
 OSCILLOSCOPES  
 RECORDING HEADS  
 TELEVISION EQUIPMENT  
 VIDEO DISKS  
 VIDICONS

VIDEO LANDMARK ACQUISITION AND TRACKING  
 2102  
 GS TRACKING (POSITION)  
 #VIDEO LANDMARK ACQUISITION AND  
 TRACKING  
 RT AVIONICS  
 IMAGE CORRELATORS  
 MAP MATCHING GUIDANCE  
 SCENE ANALYSIS  
 SIGNATURES  
 TERCOM  
 TERRAIN ANALYSIS  
 TRACKING FILTERS

# NASA THESAURUS HIERARCHICAL UPDATE

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VIDEO SIGNALS
0702
RT    SIGNAL PROCESSING
      SIGNAL TRANSMISSION
      SIGNALS
      VIDEO COMMUNICATION
      VIDEO DATA

VIDEO TAPE RECORDERS
1401 1407 3405 3501 9001
GS    RECORDING INSTRUMENTS
      .TAPE RECORDERS
      .#VIDEO TAPE RECORDERS
      VIDEO EQUIPMENT
      #VIDEO TAPE RECORDERS
RT    MULTIMEDIA
      VIDEO TAPES

VIDEO TAPES
1401 1407 3405 3501 9001
RT    AUDIO TAPES
      CINEMATOGRAPHY
      % FILMS
      INFORMATION
      MAGNETIC TAPES
      MOTION PICTURES
      MULTIMEDIA
      PHOTOGRAPHS
      PHOTOGRAPHY
      % TAPES
      VIDEO TAPE RECORDERS
      VISUAL AIDS

VIDICONS
0701 0702 0905 1409
GS    ELECTRON TUBES
      .CAMERA TUBES
      .VIDICONS
      ...RETURN BEAM VIDICONS
      ....THERMIONS
RT    ADVANCED VIDICON CAMERA SYSTEM
      (AVCS)
      FIBER OPTICS
      PIXELS
      VIDEO EQUIPMENT

VIETNAM
1305
UF    NORTH VIETNAM
      REPUBLIC OF VIETNAM
      SOUTH VIETNAM
GS    NATIONS
      #VIETNAM
RT    ASIA
      SOUTHEAST ASIA

VIEW EFFECTS
0408 1407 2402 3303
SN    (LIMITED TO EFFECTS OF CHANGE IN
      ANGULAR SIZE OF FIELD OF VIEW UPON
      RECEPTORS OF RADIATION)
RT    ANGULAR CORRELATION
      % EFFECTS
      RADIANT FLUX DENSITY
      RADIATION MEASURING INSTRUMENTS
      RADIATIVE HEAT TRANSFER
      VIEWING

VIEWING
1412 1505 3407
GS    #VIEWING
      .FIELD OF VIEW
      RT    DISPLAY DEVICES
      PERISCOPES
      VIEW EFFECTS
      VISIBILITY
      VISION

VIGILANTE AIRCRAFT
USE    A-5 AIRCRAFT

VIGNETTING
1407 2306 2310
RT    DEFECTS
      FOCUSING
      LENSES

VIKING LANDER SPACECRAFT
3007 3108 3110
GS    INTERPLANETARY SPACECRAFT
      .MARS PROBES
      ..VIKING SPACECRAFT
      ...#VIKING LANDER SPACECRAFT
      ....VIKING LANDER 1
      ....VIKING LANDER 2
      UNMANNED SPACECRAFT
      .SPACE PROBES
      ..MARS PROBES
      ...VIKING SPACECRAFT
      ....VIKING LANDER SPACECRAFT
      ....#VIKING LANDER 2
      ...#VIKING LANDER 2
      INTERPLANETARY TRAJECTORIES
      MARS SURFACE SAMPLES
      SPACE FLIGHT

VIKING MARS PROGRAM
3007 3108 3409
GS    PROGRAMS
      .NASA PROGRAMS
      ..NASA SPACE PROGRAMS
      ...#VIKING MARS PROGRAM
      .SPACE PROGRAMS
      ..NASA SPACE PROGRAMS
      ...#VIKING MARS PROGRAM
      SPACE EXPLORATION
      VIKING SPACECRAFT

VIKING ORBITER SPACECRAFT
3007 3108 3110
GS    INTERPLANETARY SPACECRAFT

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[illegible]

# NASA THESAURUS HIERARCHICAL UPDATE

.MARS PROBES  
 .#VIKING 1975 ENTRY VEHICLE  
 MARS LANDING  
 SOFT LANDING  
 RT

VINEYARDS  
 O409  
 RT AGRICULTURE  
 BLIGHT  
 BOTANY  
 CROP GROWTH  
 CROP VIGOR  
 % CROPS  
 EARTH RESOURCES  
 FARM CROPS  
 % FOOD  
 IRRIGATION  
 PLANTS (BOTANY)  
 WINES

VINTI THEORY  
 1904 3009  
 GS PERTURBATION THEORY  
 #VINTI THEORY  
 RT GEODESY  
 ORBIT PERTURBATION  
 % THEORIES

VINYL COPOLYMERS  
 1808 1809 1810  
 GS COPOLYMERS  
 #VINYL COPOLYMERS  
 PLASTICS  
 .SYNTHETIC RESINS  
 ..ADDITION RESINS  
 ..#VINYL COPOLYMERS  
 RESINS  
 .SYNTHETIC RESINS  
 ..ADDITION RESINS  
 ..#VINYL COPOLYMERS  
 VINYL POLYMERS  
 #VINYL COPOLYMERS  
 RT ADDITIVES  
 COPOLYMERIZATION  
 % POLYMERS

VINYL CYANIDE  
 USE ACRYLONITRILES

VINYL ETHYLENE  
 USE BUTADIENE

VINYL POLYMERS  
 1805 1808 1810  
 GS #VINYL POLYMERS

.POLYVINYL FLUORIDE  
 .VINYL COPOLYMERS  
 RT % POLYMERS  
 POLYVINYL ALCOHOL  
 POLYVINYL CHLORIDE

VINYL RADICAL  
 1805 1808  
 GS RADICALS  
 #VINYL RADICAL  
 RT FREE RADICALS

VINYLDIENE  
 1808 1809 1810  
 GS ORGANIC COMPOUNDS  
 .HYDROCARBONS  
 ..ALIPHATIC HYDROCARBONS  
 ...ALKENES  
 ....ETHYLENE  
 ....#VINYLDIENE

VIOLENCE  
 O408 0410 3402 3403  
 GS #VIOLENCE  
 .ATTACKING (ASSAULTING)  
 RT CRIME  
 DISORDERS  
 POLICE  
 WARFARE

VIRAL DISEASES  
 O404 0405 0408 0410 0412  
 SN (EXCLUDES PLANT DISEASES)  
 GS DISEASES  
 .INFECTIOUS DISEASES  
 .#VIRAL DISEASES  
 ...ACQUIRED IMMUNODEFICIENCY  
 SYNDROME  
 ...INFLUENZA  
 ...POLIOMYELITIS  
 ...SMALLPOX  
 RT ENCEPHALITIS  
 HEPATITIS  
 HUMAN IMMUNODEFICIENCY VIRUS  
 MENINGITIS  
 PNEUMONIA  
 VIRUSES

VIRGIN ISLANDS  
 1305  
 GS LANDFORMS  
 .ISLANDS  
 ..WEST INDIES  
 ..#VIRGIN ISLANDS  
 RT ARCHIPELAGOES

CARIBBEAN REGION  
 CARIBBEAN SEA  
 TROPICAL REGIONS  
 UNITED STATES

VIRGINIA  
 1305  
 GS NATIONS  
 .UNITED STATES  
 .#VIRGINIA  
 RT ALLEGHENY PLATEAU (US)  
 ASSATEAGUE ISLAND (MD-VA)  
 CHESAPEAKE BAY (US)  
 DELMARVA PENINSULA (DE-MD-VA)  
 POTOMAC RIVER VALLEY (MD-VA-WV)  
 SHENANDOAH VALLEY (VA)  
 WALLOPS ISLAND

VIRGO GALACTIC CLUSTER  
 1504 3001  
 UF VIRGO STAR CLUSTER  
 GS CELESTIAL BODIES  
 .GALAXIES  
 ..GALACTIC CLUSTERS  
 ..#VIRGO GALACTIC CLUSTER  
 RT AGGLOMERATION  
 BARRED GALAXIES  
 % CLUSTERS  
 DISK GALAXIES  
 ELLIPTICAL GALAXIES  
 LOCAL GROUP (ASTRONOMY)  
 SPIRAL GALAXIES  
 STAR CLUSTERS  
 STAR DISTRIBUTION  
 STARS

VIRGO STAR CLUSTER  
 USE VIRGO GALACTIC CLUSTER

VIRIAL COEFFICIENTS  
 O604  
 GS COEFFICIENTS  
 #VIRIAL COEFFICIENTS  
 EQUATIONS OF STATE  
 INTERMOLECULAR FORCES  
 VIRIAL THEOREM

VIRIAL THEOREM  
 O604 1902 2403 3009  
 GS THEOREMS  
 #VIRIAL THEOREM  
 RT KINETIC ENERGY  
 KINETIC EQUATIONS  
 % MECHANICS (PHYSICS)  
 MISSING MASS (ASTROPHYSICS)





# NASA THESAURUS HIERARCHICAL UPDATE

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O204
GS  BAC AIRCRAFT
    #VISCOUNT AIRCRAFT
    .JET AIRCRAFT
    .TURBOPROP AIRCRAFT
    .#VISCOUNT AIRCRAFT
    MONOPLANES
    #VISCOUNT AIRCRAFT
    PASSENGER AIRCRAFT
    #VISCOUNT AIRCRAFT
    TRANSPORT AIRCRAFT
    #VISCOUNT AIRCRAFT
    RT % AIRCRAFT

    VISCIOUS DAMPING
    1809 2308 2403
    GS  DAMPING
        #VISCIOUS DAMPING
        ..VISCOELASTIC DAMPING
        RESONANCE TESTING
        VISCOELASTICITY
        VISCOPLASTICITY

    VISCIOUS DRAG
    0101 1203 2308 3203 3501
    GS  DYNAMIC CHARACTERISTICS
        .DRAG
        ..FRICTION DRAG
        ..#VISCIOUS DRAG
        FRICTION
        .FLOW RESISTANCE
        ..FRICTION DRAG
        ..#VISCIOUS DRAG
        .SKIN FRICTION
        ..FRICTION DRAG
        ..#VISCIOUS DRAG
        EDDY VISCOSITY
        HARTMANN NUMBER
        LAMINAR FLOW
        TURBULENT FLOW
        VISCOMETRY

    VISCIOUS FLOW
    1201 1202 1203
    GS  FLUID FLOW
        #VISCIOUS FLOW
        ..BOUNDARY LAYER FLOW
        ...REATACHED FLOW
        ...SECONDARY FLOW
        ...SEPARATED FLOW
        ....BOUNDARY LAYER SEPARATION
        ...COUETTE FLOW
        ..KARMAN-BODEWADT FLOW
        ..STOKES FLOW

RT  AERODYNAMICS
    BAROTROPIC FLOW
    EDDY VISCOSITY
    % FLOW CHARACTERISTICS
    GAS FLOW
    INVISCID FLOW
    KNUDSEN FLOW
    LAMINAR FLOW
    MAGNETOHYDRODYNAMIC SHEAR HEATING
    MAXWELL FLUIDS
    MILNE-THOMSON METHOD
    NAVIER-STOKES EQUATION
    POHLHAUSEN METHOD
    PRANDTL NUMBER
    REYNOLDS NUMBER
    TURBULENT FLOW
    VISCOMETRY
    VISCOPUMPS
    VISCOSITY
    WEDGE FLOW

    VISCIOUS FLUIDS
    1202 1203
    RT  FLOW STABILITY
        % FLUIDS
        MAXWELL FLUIDS
        NAVIER-STOKES EQUATION
        NEWTONIAN FLUIDS
        NONNEWTONIAN FLUIDS
        OSEEN APPROXIMATION
        SEMISOLIDS
        SQUEEZE FILMS
        WEIGHTLESS FLUIDS

    VISIBILITY
    0408 0502 2103
    UF  INVISIBILITY
    GS  #VISIBILITY
        .LOW VISIBILITY
    RT  APPEARANCE
        BRIGHTNESS
        CEILINGS (METEOROLOGY)
        CHARACTER RECOGNITION
        COLOR
        CONTRAST
        DARKENING
        FOG
        GLARE
        HAZE
        HUMAN FACTORS ENGINEERING
        ILLUMINANCE
        IMAGE CONTRAST
        LEGIBILITY
        LIGHT (VISIBLE RADIATION)

RT  LIGHT TRANSMISSION
    LUMINESCENCE
    LUMINOSITY
    NIGHT FLIGHTS (AIRCRAFT)
    OPACITY
    OPTICAL PROPERTIES
    PERCEPTION
    RADIANCE
    READING
    RESOLUTION
    RETINAL ADAPTATION
    SENSITIVITY
    SMOKE
    SYMBOLS
    TRANSMISSIVITY
    VIEWING
    VISION
    VISUAL CONTROL
    WHITEOUT

    VISIBLE INFRARED SPIN SCAN RADIOMETER
    1404
    RT  ATMOSPHERIC SOUNDING
        INFRARED RADIOMETERS
        SATELLITE SOUNDING
        SATELLITE-BORNE INSTRUMENTS

    VISIBLE RADIATION
    USE LIGHT (VISIBLE RADIATION)

    VISIBLE SPECTRUM
    2306 2903
    GS  SPECTRA
        .RADIATION SPECTRA
        ..ELECTROMAGNETIC SPECTRA
        ..#VISIBLE SPECTRUM
    RT  % ABSORPTION
        ABSORPTION SPECTRA
        ASTRONOMICAL SPECTROSCOPY
        AURORAL SPECTROSCOPY
        CATHODOLUMINESCENCE
        EMISSION SPECTRA
        GAS SPECTROSCOPY
        LIGHT (VISIBLE RADIATION)
        LINE SPECTRA
        MOLECULAR SPECTRA
        SOLAR SPECTRA
        SPECTRAL BANDS
        SPECTROSCOPY
        STELLAR SPECTRA

    VISION
    0408
    UF  MACULAR VISION
    GS  #VISION
  
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|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                          |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| RT                   | .BINOCULAR VISION<br>.COLOR VISION<br>.MONOCULAR VISION<br>.NIGHT VISION<br>.PERIPHERAL VISION<br>.STEREOSCOPIC VISION<br>ADAPTATION<br>ANASTIGMATISM<br>BLINDNESS<br>BRIGHTNESS<br>CHOROIC MEMBRANES<br>COLOR<br>CONJUNCTIVA<br>CONTRAST<br>CORNEA<br>DARK ADAPTATION<br>EYE (ANATOMY)<br>EYE DOMINANCE<br>FLASH BLINDNESS<br>GLARE<br>HETEROPHORIA<br>HUMAN FACTORS ENGINEERING<br>HYPEROPIA<br>ILLUSIONS<br>IMAGES<br>LEGIBILITY<br>LIGHT ADAPTATION<br>MIOSIS<br>MYOPIA<br>OCULOMOTOR NERVES<br>OPHTHALMODYNAMOMETRY<br>OPTOMETRY<br>PERCEPTION<br>PHOSPHENE<br>PRESBYOPIA<br>PUPILS<br>RESOLUTION<br>RETINA<br>RETINAL ADAPTATION<br>RETINAL IMAGES<br>THRESHOLDS (PERCEPTION)<br>VIEWING<br>VISIBILITY<br>VISUAL ACUITY | VISUAL ACUITY<br>O408 O502<br>GS<br>ACUITY<br>#VISUAL ACUITY<br>..HYPEROPIA<br>RT PERIPHERAL VISION<br>SNELEN TESTS<br>VISION                                                                                                                                                                                                                                                                                                | O404 O408<br>RT FIELD OF VIEW<br>% FIELDS<br>PERIPHERAL VISION<br>RETINA<br>RETINAL IMAGES<br>SACCADIC EYE MOVEMENTS<br>SPACE PERCEPTION |
|                      | VISUAL AIDS<br>O405 O408 O502 O508 9001<br>RT % AIDS<br>AUDIO VISUAL EQUIPMENT<br>AUDIO VISUAL MATERIAL<br>CHARTS<br>DIAGRAMS<br>DISPLAY DEVICES<br>DRAWINGS<br>MULTIMEDIA<br>PHOTOGRAPHS<br>TRAINING DEVICES<br>VIDEO TAPES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | VISUAL FLIGHT<br>O201 O408 O502<br>RT AIR NAVIGATION<br>COLLISION AVOIDANCE<br>% FLIGHT<br>FLIGHT CONDITIONS<br>FLIGHT PATHS<br>FLIGHT SAFETY<br>LANDING<br>WHITEOUT                                                                                                                                                                                                                                                         |                                                                                                                                          |
|                      | VISUAL CONTROL<br>O502 O503 O506 2102<br>GS MANUAL CONTROL<br>#VISUAL CONTROL<br>RT AIRCRAFT CONTROL<br>APPROACH CONTROL<br>ATTITUDE CONTROL<br>% CONTROL<br>DISPLAY DEVICES<br>GUIDANCE (MOTION)<br>MISSILE CONTROL<br>REMOTE CONTROL<br>RUNWAY LIGHTS<br>SERVOCONTROL<br>SPACECRAFT CONTROL<br>VISIBILITY                                                                                                                                                                                                                                                                                                                                                                                                                   | VISUAL FLIGHT RULES<br>O203 O502 1101 1402<br>UF VFR (RULES)<br>GS<br>.FLIGHT RULES<br>.#VISUAL FLIGHT RULES                                                                                                                                                                                                                                                                                                                 |                                                                                                                                          |
|                      | VISUAL DISCRIMINATION<br>O405 O408<br>GS DISCRIMINATION<br>.SENSORY DISCRIMINATION<br>.#VISUAL DISCRIMINATION<br>PERCEPTION<br>.SENSORY PERCEPTION<br>..VISUAL PERCEPTION<br>..#VISUAL DISCRIMINATION<br>RT % RECOVERY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | VISUAL OBSERVATION<br>O408 O502 3009<br>GS OBSERVATION<br>#VISUAL OBSERVATION<br>RT COMPANION STARS<br>SEEING (ASTRONOMY)<br>SPACE OBSERVATIONS (FROM EARTH)                                                                                                                                                                                                                                                                 |                                                                                                                                          |
| VISORS<br>O508<br>RT | EYE PROTECTION<br>RADIATION PROTECTION<br>SUNGLASSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | VISUAL PERCEPTION<br>O404 O408<br>UF SIGHT<br>GS PERCEPTION<br>.SENSORY PERCEPTION<br>.#VISUAL PERCEPTION<br>...CRITICAL FLICKER FUSION<br>...SPACE PERCEPTION<br>...AUTOKINESIS<br>...VISUAL DISCRIMINATION<br>RT AFTERIMAGES<br>BLINKING<br>BRIGHTNESS DISCRIMINATION<br>ELEVATOR ILLUSION<br>MOTION PERCEPTION<br>% ORIENTATION<br>PERCEPTUAL ERRORS<br>% SPACE ORIENTATION<br>TACHISTOSCOPIES<br>THRESHOLDS (PERCEPTION) |                                                                                                                                          |
| VISUAL<br>O404<br>RT | ACCOMMODATION<br>O408<br>RT ACCOMMODATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                          |

# NASA THESAURUS HIERARCHICAL UPDATE

## VISUAL TASKS

VISUAL PHOTOMETRY  
O408 1411 2306 3001  
GS OPTICAL MEASUREMENT  
.PHOTOMETRY  
.#VISUAL PHOTOMETRY

VISUAL PIGMENTS  
O405 1802  
GS PIGMENTS  
#VISUAL PIGMENTS  
RT DARK ADAPTATION  
PHOTORECEPTORS  
PHOTOSENSITIVITY  
RETINA

VISUAL SIGNALS  
O408 0506 0702  
RT BEACONS  
CUES  
LUMINAIRES  
OPTICAL COMMUNICATION  
% SIGNALS

VISUAL STIMULI  
O404 0408  
RT PERCEPTUAL ERRORS  
% SIGNALS  
% STIMULI  
VISUAL TASKS

VISUAL TASKS  
O408 0410 0502  
GS TASKS  
#VISUAL TASKS  
RT EYE MOVEMENTS  
HUMAN PERFORMANCE  
VISUAL PERCEPTION  
VISUAL STIMULI

VISUAL TRACKING  
USE OPTICAL TRACKING

VISUALIZATION OF FLOW  
USE FLOW VISUALIZATION

VITAMIN A  
USE RETINENE

VITAMIN B  
USE THIAMINE

VITAMIN B COMPLEX  
USE BIOTIN

VITAMIN B 2  
USE RIBOFLAVIN

VITAMIN B 6  
USE PYRIDOXINE

VITAMIN B 12  
USE CYANOCOBALAMIN

VITAMIN C  
USE ASCORBIC ACID

VITAMIN D  
USE CALCIFEROL

VITAMIN E  
USE TOCOPHEROL

VITAMIN G  
USE RIBOFLAVIN

VITAMIN K  
USE PHYLLOQUINONE

VITAMIN M  
USE FOLIC ACID

VITAMIN P  
USE BIOFLAVONOIDS

VITAMINS  
O403 1808  
GS #VITAMINS  
.ASCORBIC ACID  
.BIOFLAVONOIDS  
.BIOTIN  
.CALCIFEROL  
.CARNITINE  
.CYANOCOBALAMIN  
.FOLIC ACID  
.NICOTINAMIDE  
.NICOTINIC ACID  
.PHYLLOQUINONE  
.PYRIDOXINE  
.RETINENE  
.RIBOFLAVIN  
.THIAMINE

RT ASCORBIC ACID METABOLISM  
CHOLINE  
DRUGS  
% FOOD  
% NUTRIENTS

VITERBI DECODERS  
O701 0702 0801 0802  
GS DECODERS  
#VITERBI DECODERS  
RT CODING  
DECODING  
SIGNAL ENCODING  
SIGNAL PROCESSING

VITON RUBBER (TRADEMARK)  
1808 1809 1810  
GS COPOLYMERS  
#VITON RUBBER (TRADEMARK)  
RUBBER  
.SYNTHETIC RUBBERS  
..ELASTOMERS  
..#VITON RUBBER (TRADEMARK)  
RT FLUOROHYDROCARBONS

VITREOUS MATERIALS  
1801 1805  
RT FRIT  
GLASS  
% INORGANIC MATERIALS  
% MATERIALS  
METALLIC GLASSES  
PORCELAIN  
VITRIFICATION

VITRIFICATION  
1801  
RT CERAMICS  
GLASS  
PORCELAIN  
SOLIDIFICATION  
VITREOUS MATERIALS

VJ-101 AIRCRAFT  
O207 0209  
UF SUD VJ-101 AIRCRAFT  
GS ATTACK AIRCRAFT  
.FIGHTER AIRCRAFT  
.VJ-101 AIRCRAFT  
JET AIRCRAFT  
#VJ-101 AIRCRAFT  
MONOPLANES  
#VJ-101 AIRCRAFT  
SINGLE ENGINE AIRCRAFT  
#VJ-101 AIRCRAFT  
SUD AVIATION AIRCRAFT  
#VJ-101 AIRCRAFT  
SUPERSONIC AIRCRAFT  
#VJ-101 AIRCRAFT  
V/STOL AIRCRAFT  
.VERTICAL TAKEOFF AIRCRAFT

| RT %                          | AIRCRAFT                          | RT | AUDIO FREQUENCIES | VOICE COMMUNICATION           |
|-------------------------------|-----------------------------------|----|-------------------|-------------------------------|
| VLASOV EQUATIONS              | .#VJ-101 AIRCRAFT                 | RT | SPEECH            | VOICE CONTROL                 |
| 1902                          | 2309 2402 2403 3501               |    | TONGUE            |                               |
| GS                            | ANALYSIS (MATHEMATICS)            |    |                   | VOICE OF AMERICA              |
|                               | REAL VARIABLES                    |    |                   | 0702 0705 3403 3405           |
|                               | ..DIFFERENTIAL EQUATIONS          |    |                   | RT BROADCASTING               |
|                               | ...PARTIAL DIFFERENTIAL EQUATIONS |    |                   | RADIO TRANSMISSION            |
|                               | ...#VLASOV EQUATIONS              |    |                   |                               |
| RT %                          | EQUATIONS                         |    |                   | VOID RATIO                    |
|                               | STABILITY                         |    |                   | 1203 2203 2204                |
| VLBI                          |                                   |    |                   | UF COMPACTNESS                |
| USE                           | VERY LONG BASE INTERFEROMETRY     |    |                   | GS RATIOS                     |
|                               |                                   |    |                   | RT % CONDUCTIVITY             |
| VLF EMISSION RECORDERS        |                                   |    |                   | DENSITY (MASS/VOLUME)         |
| 0701 0705 0710 0905 2402 2903 |                                   |    |                   | FREE FLOW                     |
| RT                            | ATMOSPHERIC RADIATION             |    |                   | HOLE DISTRIBUTION (MECHANICS) |
|                               | ATMOSPHERICS                      |    |                   | PACKING DENSITY               |
|                               | COSMIC RAYS                       |    |                   | PERMEABILITY                  |
|                               | ELECTROMAGNETIC RADIATION         |    |                   | POROSITY                      |
|                               | PLANETARY RADIATION               |    |                   | REACTOR CORES                 |
| %                             | RECORDERS                         |    |                   | SURFACE PROPERTIES            |
|                               | RECORDING INSTRUMENTS             |    |                   | VOIDS                         |
| VLBI                          |                                   |    |                   | VOIDS                         |
| USE                           | VERY LARGE SCALE INTEGRATION      |    |                   | 2311 2601                     |
|                               |                                   |    |                   | 1704                          |
| VOCAL CORDS                   |                                   |    |                   | RT BUOYANCY                   |
| 0404 0408                     |                                   |    |                   | CAVITIES                      |
| GS                            | ANATOMY                           |    |                   | CRACK GEOMETRY                |
|                               | .RESPIRATORY SYSTEM               |    |                   | CRACK OPENING DISPLACEMENT    |
|                               | ..LARYNX                          |    |                   | DEFECTS                       |
|                               | ..#VOCAL CORDS                    |    |                   | INCLUSIONS                    |
| RT                            | GLOTTIS                           |    |                   | INFILTRATION                  |
|                               |                                   |    |                   | INTERSTICES                   |
|                               |                                   |    |                   | PERCOLATION                   |
|                               |                                   |    |                   | PERMEABILITY                  |
|                               |                                   |    |                   | POROSITY                      |
|                               |                                   |    |                   | VOID RATIO                    |
| VOCODERS                      |                                   |    |                   | VOIGT EFFECT                  |
| 0701 0702 0703 0802           |                                   |    |                   | 1203 2306 2307 2310           |
| RT                            | BANDPASS FILTERS                  |    |                   | RT BIREFRINGENCE              |
|                               | COMPUTERS                         |    |                   | % EFFECTS                     |
|                               | DIGITAL TO VOICE TRANSLATORS      |    |                   | OPTICAL PATHS                 |
|                               | FREQUENCY MODULATION              |    |                   | REFRACTION                    |
|                               | MESSAGES                          |    |                   | ZEEMAN EFFECT                 |
|                               | RADIO COMMUNICATION               |    |                   |                               |
|                               | SCRAMBLING (COMMUNICATION)        |    |                   | VOLATILITY                    |
|                               | SIGNAL RECEPTION                  |    |                   | 0603 3301                     |
|                               | SPEECH BASEBAND COMPRESSION       |    |                   | GS THERMODYNAMIC PROPERTIES   |
|                               | VOICE COMMUNICATION               |    |                   | .THERMOPHYSICAL PROPERTIES    |
|                               | VOICE DATA PROCESSING             |    |                   | ..VOLATILITY                  |
|                               |                                   |    |                   | RT COAL GASIFICATION          |
|                               |                                   |    |                   | EVAPORATION                   |
|                               |                                   |    |                   | FLASH POINT                   |

PREVAPORIZATION  
VAPOR PHASES  
VAPOR PRESSURE  
VAPORIZING

VOLCANICS  
USE VOLCANOLOGY

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#VOLCANOES
..MARS VOLCANOES
LANDFORMS
#VOLCANOES
..MARS VOLCANOES
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GEOMORPHOLOGY  
GEOTHERMAL RESOURCES  
LAVA

VOLCANOLOGY  
1305 1306 1308  
UF VOLCANICS  
GS GEOLOGY

MARS VOLCANOES  
MOUNTAINS  
OROGRAPHY  
PALEOMAGNETISM  
PETROLOGY  
ROUSE BELTS  
VOLCANOES

1571

#VOLTAGE CONVERTERS (AC TO AC)  
#ALTERNATING CURRENT  
#AUXILIARY POWER SOURCES  
% CONVERTERS  
% ELECTRIC EQUIPMENT  
% ELECTRIC POWER  
% POWER SUPPLIES

VOLTMETERS  
0904 0905 1402 1406

|                       |                              |                        |                           |      |      |                               |
|-----------------------|------------------------------|------------------------|---------------------------|------|------|-------------------------------|
| UF                    | VOLTAGE VARIATION INDICATORS | 0101                   | 1202                      | 1203 | 3203 | AIRCRAFT LANDING              |
| GS                    | MEASURING INSTRUMENTS        | GS                     | FLOW EQUATIONS            |      |      | BUFFETING                     |
|                       | #VOLTMMETERS                 | RT                     | % EQUATIONS               |      |      | GUSTS                         |
|                       | ..MILLIVOLTMETERS            |                        | FLOW STABILITY            |      |      | ROTATION                      |
| RT                    | AMMETERS                     |                        | KARMAN VORTEX STREET      |      |      | SAFETY                        |
|                       | COULOMETERS                  |                        | VORTEX BREAKDOWN          |      |      | TURBULENT FLOW                |
|                       | ELECTROMETERS                |                        | VORTEX STREETS            |      |      | VORTICES                      |
|                       | POTENTIOMETERS (INSTRUMENTS) |                        | VORTICITY EQUATIONS       |      |      | WINGLETS                      |
| VOLUME                |                              | VON MISES THEORY       |                           |      |      | VORTEX BREAKDOWN              |
| 1902                  | 3406 3408                    | USE                    | STRESS FUNCTIONS          |      |      | 0101 1202 1203                |
| GS                    | #VOLUME                      |                        |                           |      |      | RT                            |
|                       | ..BODY VOLUME (BIOLOGY)      |                        |                           |      |      | FLOW STABILITY                |
| RT                    | AREA                         | VON ZEIPPEL METHOD     |                           |      |      | TURBULENT FLOW                |
| %                     | CAPACITY                     | 1901 3001 3003         |                           |      |      | VON KARMAN EQUATION           |
|                       | DIMENSIONS                   | RT                     | EQUATIONS OF MOTION       |      |      | VORTEX FLAPS                  |
|                       | FRUSTUMS                     |                        | HAMILTONIAN FUNCTIONS     |      |      |                               |
|                       | GEOMETRY                     | %                      | METHODOLOGY               |      |      | VORTEX COLUMNS                |
|                       | ISOCHORIC PROCESSES          |                        | PERTURBATION THEORY       |      |      | USE                           |
|                       | RATES (PER TIME)             |                        |                           |      |      | VORTICES                      |
|                       | THICKNESS                    | VOODOO AIRCRAFT        |                           |      |      | VORTEX DISTURBANCES           |
|                       | VOLUMETRIC ANALYSIS          | USE                    | F-101 AIRCRAFT            |      |      | USE                           |
|                       | WEIGHT (MASS)                |                        |                           |      |      | VORTICES                      |
| VOLUMETRIC ANALYSIS   |                              | VOR SYSTEMS            |                           |      |      | VORTEX FILAMENTS              |
| 0601                  |                              | USE                    | VHF OMNIRANGE NAVIGATION  |      |      | 1203 3501                     |
| GS                    | CHEMICAL TESTS               |                        |                           |      |      | RT                            |
|                       | ..CHEMICAL ANALYSIS          | VORTEX ADVISORY SYSTEM |                           |      |      | FILAMENTS                     |
|                       | ..#VOLUMETRIC ANALYSIS       | 0101                   |                           |      |      | FLOW STABILITY                |
| RT                    | ANALYTICAL CHEMISTRY         | RT                     | AIR TRAFFIC CONTROL       |      |      | FLUID DYNAMICS                |
|                       | GAS ANALYSIS                 |                        | AIRCRAFT APPROACH SPACING |      |      | HORSESHOE VORTICES            |
|                       | QUANTITATIVE ANALYSIS        | %                      | AIRCRAFT WAKES            |      |      | TURBULENCE                    |
|                       | VOLUME                       |                        | TURBULENT WAKES           |      |      | VORTEX IN CELL TECHNIQUE      |
| VOLUMETRIC EFFICIENCY |                              |                        | VORTEX ALLEVIATION        |      |      | VORTICES                      |
| 0301                  |                              | VORTEX ALLEVIATION     |                           |      |      | VORTEX FLAPS                  |
| RT                    | ENERGY CONVERSION EFFICIENCY | 0101                   |                           |      |      | 0102                          |
|                       | ENGINE DESIGN                | RT                     | AIRCRAFT WAKES            |      |      | GS                            |
|                       | FUEL-AIR RATIO               |                        | DAG DEVICES               |      |      | AIRFOILS                      |
|                       | LASER OUTPUTS                |                        | GUST ALLEVIATORS          |      |      | ..FLAPS (CONTROL SURFACES)    |
| VOLUMETRIC STRAIN     |                              |                        | PROTUBERANCES             |      |      | ..WING FLAPS                  |
| 3203                  |                              |                        | RIBLETS                   |      |      | ..#VORTEX FLAPS               |
| GS                    | FATIGUE (MATERIALS)          |                        | SPOILERS                  |      |      | BRAKES (FOR ARRESTING MOTION) |
|                       | #VOLUMETRIC STRAIN           |                        | VORTEX ADVISORY SYSTEM    |      |      | ..AERODYNAMIC BRAKES          |
| RT                    | DEFORMATION                  |                        | VORTICES                  |      |      | ..WING FLAPS                  |
|                       | STRUCTURAL STRAIN            |                        | WAKES                     |      |      | ..#VORTEX FLAPS               |
|                       | TEMPERATURE INVERSIONS       |                        | WINGLETS                  |      |      | CONTROL SURFACES              |
| VOMITING              |                              |                        |                           |      |      | ..FLAPS (CONTROL SURFACES)    |
| 0405 0408             |                              | VORTEX AVOIDANCE       |                           |      |      | ..WING FLAPS                  |
| RT                    | MOTION SICKNESS              | 0101                   |                           |      |      | ..#VORTEX FLAPS               |
|                       | NAUSEA                       | GS                     | AVOIDANCE                 |      |      | DAG DEVICES                   |
| VON KARMAN EQUATION   |                              |                        | #VORTEX AVOIDANCE         |      |      | ..AERODYNAMIC BRAKES          |
|                       |                              | RT                     | AERODYNAMIC STABILITY     |      |      | ..WING FLAPS                  |
|                       |                              |                        | AIR TRAFFIC CONTROL       |      |      | ..#VORTEX FLAPS               |
|                       |                              |                        | AIRCRAFT APPROACH SPACING |      |      | DRAG DEVICES                  |
|                       |                              |                        |                           |      |      | ..AERODYNAMIC BRAKES          |
|                       |                              |                        |                           |      |      | ..WING FLAPS                  |
|                       |                              |                        |                           |      |      | ..#VORTEX FLAPS               |
|                       |                              |                        |                           |      |      | DRAG DEVICES                  |
|                       |                              |                        |                           |      |      | ..AERODYNAMIC BRAKES          |
|                       |                              |                        |                           |      |      | ..WING FLAPS                  |
|                       |                              |                        |                           |      |      | ..#VORTEX FLAPS               |
|                       |                              |                        |                           |      |      | AERODYNAMIC DRAG              |
|                       |                              |                        |                           |      |      | JET FLAPS                     |
|                       |                              |                        |                           |      |      | LEADING EDGE FLAPS            |
|                       |                              |                        |                           |      |      | LEADING EDGES                 |
|                       |                              |                        |                           |      |      | LIFT AUGMENTATION             |

# NASA THESAURUS HIERARCHICAL UPDATE

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SEPARATED FLOW
TRAILING EDGE FLAPS
TRAILING EDGES
VORTEX BREAKDOWN
VORTICES
WING LOADING

VORTEX FLOW
USE VORTICES

VORTEX GENERATION
USE VORTEX GENERATORS

VORTEX GENERATORS
1201 1202 1203 2502
UF VORTEX GENERATION
RT AIRFOIL FENCES
BOUNDARY LAYER CONTROL
BOUNDARY LAYER SEPARATION
% GENERATORS
HILSCH TUBES
HORSESHOE VORTICES
INLET FLOW
VORTICES
WING SLOTS

VORTEX IN CELL TECHNIQUE
1902 3501
UF VIC METHOD
GS ANALYSIS (MATHEMATICS)
.. NUMERICAL ANALYSIS
.. APPROXIMATION
..#VORTEX IN CELL TECHNIQUE
RT COMPUTATIONAL FLUID DYNAMICS
FAST FOURIER TRANSFORMATIONS
FINITE DIFFERENCE THEORY
% METHODOLOGY
PARTICLE IN CELL TECHNIQUE
POISSON EQUATION
VORTEX FILAMENTS
VORTICES

VORTEX INJECTORS
1201 1202 1203
GS INJECTORS
#VORTEX INJECTORS

VORTEX LATTICE METHOD
RT BOUNDARY CONDITIONS
COMPUTATIONAL FLUID DYNAMICS
FLOW VELOCITY
FLUX VECTOR SPLITTING
LATTICES (MATHEMATICS)
PANEL METHOD (FLUID DYNAMICS)
VORTICES

VORTEX PRECESSION
O101
RT FLOW VELOCITY
FLOWMETERS
PRECESSION
VELOCITY MEASUREMENT
VORTICES

VORTEX RINGS
O101 1202 1203
RT HORSESHOE VORTICES
% RINGS
TRAPPED VORTICES
VORTICES

VORTEX SHEDDING
1701
GS FLUID MECHANICS
. FLUID DYNAMICS
.#VORTEX SHEDDING
RT SHEDDING
VORTICES

VORTEX SHEETS
O101 1201 1202 1203 1204
RT AIRCRAFT DESIGN
FLOW DISTRIBUTION
ROTATING FLUIDS
% SHEETS
TURBULENT WAKES
VORTICES
VORTICITY

VORTEX STREETS
1202 1203 1204
GS #VORTEX STREETS
.KARMAN VORTEX STREET
RT DISCONTINUITY
% SHEETS
TURBULENT WAKES
VON KARMAN EQUATION
VORTICES

VORTEX TRAPS
USE TRAPPED VORTICES

VORTEX TUBES
USE HILSCH TUBES
VORTICES

VORTEX-BLADE INTERACTION
USE BLADE-VORTEX INTERACTION
VORTICES

VORTEX PRECESSION
O101 1201 1202 2311
UF EDDIES
ROTATIONAL FLOW
VORTEX COLUMNS
VORTEX DISTURBANCES
VORTEX FLOW
VORTEX TUBES
GS #VORTICES
.HORSESHOE VORTICES
.TRAPPED VORTICES
.WING TIP VORTICES
ABRIKOSOV THEORY
AGITATION
BLADE-VORTEX INTERACTION
CAVITATION FLOW
COUNTERFLOW
% DISTURBANCES
DIVERGENCE
FLOW DISTORTION
FLOW STABILITY
FLUID FLOW
GOERTLER INSTABILITY
HILSCH TUBES
KOLMOGOROV THEORY
METEOROLOGICAL SOLENOIDS
MIXING
PLANETARY WAVES
RECIRCULATIVE FLUID FLOW
ROTATING FLUIDS
ROTATING LIQUIDS
ROTATION
SECONDARY FLOW
STROUHAL NUMBER
SUPERCONDUCTIVITY
SUPERFLUIDITY
THRUST DISTRIBUTION
TURBULENCE
TURBULENT FLOW
TURBULENT MIXING
VORTEX ALLEVATION
VORTEX AVOIDANCE
VORTEX FILAMENTS
VORTEX FLAPS
VORTEX GENERATORS
VORTEX IN CELL TECHNIQUE
VORTEX LATTICE METHOD
VORTEX PRECESSION
VORTEX RINGS
VORTEX SHEDDING
VORTEX SHEETS
VORTEX STREETS
VORTICITY
WAKES

VORTICITY

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1202 1203 1204
UF ENSTROPY
GS
  .VECTOR SPACES
  ..VECTORS (MATHEMATICS)
  ..#VORTICITY
  ANALYSIS (MATHEMATICS)
  .CALCULUS
  ..VECTOR ANALYSIS
  ...CURL (VECTORS)
  ...#VORTICITY
  .REAL VARIABLES
  ..VECTOR ANALYSIS
  ...CURL (VECTORS)
  ...#VORTICITY
  GEOMETRY
  .VECTOR ANALYSIS
  ..CURL (VECTORS)
  ..#VORTICITY
  RT ATMOSPHERIC CIRCULATION
  BELTRAMI FLOW
  CROCCO METHOD
  FLOW STABILITY
  HELMHOLTZ VORTICITY EQUATION
  HORSESHOE VORTICES
  POTENTIAL FLOW
  SECONDARY FLOW
  TRAPPED VORTICES
  TURBULENCE
  VORTEX SHEETS
  VORTICES

VORTICITY EQUATIONS
1201 1203 1204 1902
GS ANALYSIS (MATHEMATICS)
  .REAL VARIABLES
  ..DIFFERENTIAL EQUATIONS
  ..#VORTICITY EQUATIONS
  ...HELMHOLTZ VORTICITY EQUATION
  FLOW EQUATIONS
  #VORTICITY EQUATIONS
  ..HELMHOLTZ VORTICITY EQUATION
  RT % EQUATIONS
  KARMAN VORTEX STREET
  VON KARMAN EQUATION

VORTICITY TRANSPORT HYPOTHESIS
1202 1203 2308
GS HYPOTHESES
  #VORTICITY TRANSPORT HYPOTHESIS
  CONSERVATION EQUATIONS
  EDDY CURRENTS
  MIXING LENGTH FLOW THEORY
  TURBULENT FLOW

VOSKHO D MANNED SPACECRAFT
3104 3409
GS MANNED SPACECRAFT
  #VOSKHOD MANNED SPACECRAFT
  ..VOSKHOD 1 SPACECRAFT
  ..VOSKHOD 2 SPACECRAFT
  REENTRY VEHICLES
  .RECOVERABLE SPACECRAFT
  .#VOSKHOD MANNED SPACECRAFT
  ...VOSKHOD 1 SPACECRAFT
  ...VOSKHOD 2 SPACECRAFT
  SOFT LANDING SPACECRAFT
  #VOSKHOD MANNED SPACECRAFT
  ..VOSKHOD 1 SPACECRAFT
  ..VOSKHOD 2 SPACECRAFT
  RT SPACE CAPSULES

RT VOSKHOD 1 SPACECRAFT
3104
GS MANNED SPACECRAFT
  .VOSKHOD MANNED SPACECRAFT
  .#VOSKHOD 1 SPACECRAFT
  REENTRY VEHICLES
  .RECOVERABLE SPACECRAFT
  ..VOSKHOD MANNED SPACECRAFT
  ..#VOSKHOD 1 SPACECRAFT
  SOFT LANDING SPACECRAFT
  .VOSKHOD MANNED SPACECRAFT
  .#VOSKHOD 1 SPACECRAFT

VOSKHOD 2 SPACECRAFT
3104
GS MANNED SPACECRAFT
  .VOSKHOD MANNED SPACECRAFT
  .#VOSKHOD 2 SPACECRAFT
  REENTRY VEHICLES
  .RECOVERABLE SPACECRAFT
  ..VOSKHOD MANNED SPACECRAFT
  ..#VOSKHOD 2 SPACECRAFT
  SOFT LANDING SPACECRAFT
  .VOSKHOD MANNED SPACECRAFT
  .#VOSKHOD 2 SPACECRAFT

VOSTOK SPACECRAFT
3104
GS MANNED SPACECRAFT
  .VOSTOK SPACECRAFT
  .#VOSTOK 1 SPACECRAFT
  REENTRY VEHICLES
  .RECOVERABLE SPACECRAFT
  ..VOSTOK SPACECRAFT
  ..#VOSTOK 2 SPACECRAFT
  SOFT LANDING SPACECRAFT
  .VOSTOK SPACECRAFT
  .#VOSTOK 2 SPACECRAFT

VOSTOK 3 SPACECRAFT
3104
GS MANNED SPACECRAFT
  .VOSTOK SPACECRAFT
  .#VOSTOK 3 SPACECRAFT
  REENTRY VEHICLES
  .RECOVERABLE SPACECRAFT
  ..VOSTOK SPACECRAFT
  ..#VOSTOK 3 SPACECRAFT
  SOFT LANDING SPACECRAFT
  .VOSTOK SPACECRAFT
  .#VOSTOK 3 SPACECRAFT

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## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

TAILLESS AIRCRAFT  
 #VULCAN AIRCRAFT  
 RT % AIRCRAFT  
 AVRO 707 AIRCRAFT  
 HARRIER AIRCRAFT  
 VULCANIZATES  
 USE VULCANIZED ELASTOMERS  
 VULCANIZED ELASTOMERS  
 1809  
 UF GUM VULCANIZATES  
 VULCANIZATES  
 GS RUBBER  
 .SYNTHETIC RUBBERS  
 ..ELASTOMERS  
 ..#VULCANIZED ELASTOMERS  
 RT ADDITION RESINS  
 POLYETHER RESINS  
 THERMOPLASTIC RESINS  
 VULCANIZING  
 VULCANIZING  
 O602 1504 1808  
 GS CROSSLINKING  
 #VULCANIZING  
 RT CURING  
 VULCANIZED ELASTOMERS  
 VULNERABILITY  
 1702 3401 3408  
 GS #VULNERABILITY  
 .NUCLEAR VULNERABILITY  
 RT AIRCRAFT RELIABILITY  
 AIRCRAFT SURVIVABILITY  
 AIRPORT SECURITY  
 DURABILITY  
 INTEGRITY  
 LIFE (DURABILITY)  
 OBSTACLE AVOIDANCE  
 PENETRATION  
 PIERCING  
 RELIABILITY  
 % RESISTANCE  
 SECURITY  
 SENSITIVITY  
 SPACECRAFT DEFENSE  
 SPACECRAFT SURVIVABILITY  
 STABILITY  
 VYCOR  
 1801 1805  
 GS FIBERS  
 .SYNTHETIC FIBERS  
 .#VYCOR

GLASS  
 #VYCOR  
 SEMICONDUCTORS (MATERIALS)  
 #VYCOR  
 RT GLASS FIBERS  
 % MATERIALS  
 SILICON DIOXIDE  
 VZ-2 AIRCRAFT  
 O209  
 GS BOEING AIRCRAFT  
 #VZ-2 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #VZ-2 AIRCRAFT  
 TILT WING AIRCRAFT  
 #VZ-2 AIRCRAFT  
 V/STOL AIRCRAFT  
 #VZ-2 AIRCRAFT  
 RT % AIRCRAFT  
 VZ-8 AIRCRAFT  
 O207 O209  
 UF AIRGEEP AIRCRAFT  
 GS LIGHT AIRCRAFT  
 #VZ-8 AIRCRAFT  
 PIASECKI AIRCRAFT  
 #VZ-8 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #VZ-8 AIRCRAFT  
 V/STOL AIRCRAFT  
 .VERTICAL TAKEOFF AIRCRAFT  
 .#VZ-8 AIRCRAFT  
 RT % AIRCRAFT  
 FLYING PLATFORMS  
 VZ-10 AIRCRAFT  
 USE XV-4 AIRCRAFT  
 VZ-11 AIRCRAFT  
 USE XV-5 AIRCRAFT  
 VZ-12 AIRCRAFT  
 USE P-1127 AIRCRAFT  
 W STARS  
 USE WOLF-RAYET STARS  
 W WINGS  
 USE VARIABLE SWEEP WINGS  
 W-R STARS  
 USE WOLF-RAYET STARS  
 WABASH RIVER BASIN (IL-IN-OH)  
 1305

GS LANDFORMS  
 .STRUCTURAL BASINS  
 .RIVER BASINS  
 ..#WABASH RIVER BASIN (IL-IN-OH)  
 RT ILLINOIS  
 INDIANA  
 OHIO  
 RIVERS  
 WADIS  
 1305  
 GS LANDFORMS  
 .STRUCTURAL BASINS  
 .RIVER BASINS  
 ..#WADIS  
 RT ARID LANDS  
 DESERTIFICATION  
 RIVERS  
 STREAMS  
 TOPOGRAPHY  
 VALLEYS  
 WATER RUNOFF  
 WAFERS  
 O903  
 RT MICROELECTRONICS  
 MICROMINIATURIZATION  
 MINIATURIZATION  
 PHOTOMASKS  
 SEMICONDUCTOR DEVICES  
 SOLID STATE DEVICES  
 THIN FILMS  
 VERTICAL JUNCTION SOLAR CELLS  
 WAGE SURVEYS  
 3406  
 GS REPORTS  
 #WAGE SURVEYS  
 SURVEYS  
 #WAGE SURVEYS  
 COST ANALYSIS  
 COST ESTIMATES  
 COST REDUCTION  
 EMPLOYEE RELATIONS  
 FINANCE  
 PERSONNEL  
 WAKEFULNESS  
 O408 O502  
 RT ALERTNESS  
 SLEEP DEPRIVATION  
 WAKES  
 O101 O203 1202 2311  
 GS #WAKES

# NASA THESAURUS HIERARCHICAL UPDATE

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.AIRCRAFT WAKES
..HELICOPTER WAKES
..SLIPSTREAMS
...PROPELLER SLIPSTREAMS
.HYPERSONIC WAKES
.LAMINAR WAKES
.NEAR WAKES
.SUPERSONIC WAKES
.TURBULENT WAKES
..SLIPSTREAMS
...PROPELLER SLIPSTREAMS
BACKWASH
BASE FLOW
BUBBLES
CAVITATION FLOW
CONTRAILS
DOWNWASH
% DRAFT
DRAFT
GROUND EFFECT (AERODYNAMICS)
HORSESHOE VORTICES
STROUHAL NUMBER
TURBULENCE
VORTEX ALLEVATION
VORTICES

WAKES
1305
GS
NATIONS
.UNITED KINGDOM
.#WALES
RT
EUROPE

WALKING
O404
GS
LOCOMOTION
#WALKING
RT
PHYSICAL EXERCISE

WALKING MACHINES
O506
1504
GS
SURFACE VEHICLES
#WALKING MACHINES
RT
ASTRONAUT MANEUVERING EQUIPMENT
LUNAR SURFACE VEHICLES
% MACHINERY
MANNED LUNAR SURFACE VEHICLES
PROSTHETIC DEVICES

WALL FLOW
1201
1202
1203
2502
3203
GS
FLUID FLOW
#WALL FLOW
RT
BOUNDARY LAYER FLOW
CHANNEL FLOW

CONICAL FLOW
DISCHARGE COEFFICIENT
DUCTED FLOW
GOERTLER INSTABILITY
HEAT TRANSMISSION
MANNING THEORY
TWO DIMENSIONAL FLOW
TWO DIMENSIONAL JETS

WALL JETS
1201
1202
1203
RT
FLUID AMPLIFIERS
JET BOUNDARIES
JET FLOW
JET VANES
% JETS

WALL PRESSURE
1201
1202
1203
1408
3203
3501
GS
PRESSURE
#WALL PRESSURE
RT
BOUNDARY LAYERS
PRESSURE DISTRIBUTION
PRESSURE VESSELS
THICK WALLS

WALL TEMPERATURE
1408
3203
3303
3501
GS
SURFACE PROPERTIES
.SURFACE TEMPERATURE
.#WALL TEMPERATURE
TEMPERATURE
.SURFACE TEMPERATURE
.#WALL TEMPERATURE
OPERATING TEMPERATURE
THICK WALLS

WALLOPS ISLAND
1305
GS
LANDFORMS
.ISLANDS
.#WALLOPS ISLAND
RT
ATLANTIC OCEAN
VIRGINIA

WALLS
1106
2311
3202
3203
UF
COLD WALLS
GS
#WALLS
.BULKHEADS
.NOZZLE WALLS
.POROUS WALLS
.THICK WALLS
.THIN WALLS
.TROMBE WALLS

.WIND TUNNEL WALLS
RT
% BARRIERS
BUILDINGS
CURTAINS
ENCLOSURES
FLOORS
GATES (OPENINGS)
HOUSINGS
LIMITERS (FUSION REACTORS)
PANELS
PARTITIONS (STRUCTURES)
SANDWICH STRUCTURES
SHEATHS
SHELLS (STRUCTURAL FORMS)
SIDES
STUDS (STRUCTURAL MEMBERS)
SUBSTRUCTURES
TILES

WALSH FUNCTION
1411
1902
GS
FUNCTIONS (MATHEMATICS)
.ORTHOGONAL FUNCTIONS
.#WALSH FUNCTION
RT
FAST FOURIER TRANSFORMATIONS
FOURIER TRANSFORMATION
FUNCTIONAL ANALYSIS
MATRICES (MATHEMATICS)

WANKEL ENGINES
1504
2801
GS
ENGINES
.INTERNAL COMBUSTION ENGINES
..ROTARY ENGINES
..#WANKEL ENGINES
RT
AIRCRAFT ENGINES
AUTOMOBILE ENGINES
PISTON ENGINES

WAR GAMES
O804
1902
3401
RT
DIGITAL SIMULATION
GAME THEORY
MATHEMATICAL MODELS
OPERATIONS RESEARCH
SIMULATION

WARFARE
3401
3403
GS
#WARFARE
.ANTISHIP WARFARE
.ANTISUBMARINE WARFARE
.CHEMICAL WARFARE
.COMBAT
.ELECTRONIC WARFARE

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RT .NUCLEAR WARFARE  
 ATTACKING (ASSAULTING)  
 B-1 AIRCRAFT  
 CHEMICAL DEFENSE  
 EVASIVE ACTIONS  
 INFILTRATION  
 INTERNATIONAL LAW  
 ORDNANCE  
 PEACETIME  
 POLITICS  
 STRATEGY  
 VIOLENCE

WARHEADS  
 2205 3302 3401  
 GS WEAPONS  
 #WARHEADS  
 ..NUCLEAR WARHEADS  
 ..PRECISION GUIDED PROJECTILES  
 RT AMMUNITION  
 ANTISHIP WARFARE  
 BOMBS (ORDNANCE)  
 EXPLOSIVE DEVICES  
 EXPLOSIVES  
 % FUSES  
 FUSES (ORDNANCE)  
 MISSILE COMPONENTS  
 MISSILES  
 NOSE CONES  
 NUCLEAR DEVICES  
 NUCLEAR WEAPONS  
 PAYLOADS  
 PROJECTILES  
 % ROCKETS  
 SHAPED CHARGES  
 TORPEDOES

WARM BLOODED ANIMALS  
 USE HOMEOTHERMS

WARM FRONTS  
 2003 2006  
 GS FRONTS (METEOROLOGY)  
 #WARM FRONTS  
 RT AIR MASSES  
 COLD FRONTS  
 % FRONTS  
 METEOROLOGICAL PARAMETERS  
 METEOROLOGY  
 STORMS  
 SYNOPSIS METEOROLOGY  
 THUNDERSTORMS  
 TORNADOES  
 WEATHER FORECASTING

WARNING  
 USE HEATING

WARNING  
 0702 0705 3401  
 RT ACCIDENT PREVENTION  
 AUDITORY SIGNALS  
 BELLS  
 CIVIL DEFENSE  
 COLLISION AVOIDANCE  
 DETECTION  
 % DETECTORS  
 EARLY WARNING SYSTEMS  
 FIRE PREVENTION  
 HORNS  
 MINE DETECTORS  
 MONITORS  
 PROTECTION  
 SAFETY  
 SAFETY DEVICES

WARNING DEVICES  
 USE WARNING SYSTEMS

WARNING SIGNALS  
 USE WARNING SYSTEMS

WARNING STAR AIRCRAFT  
 USE EC-121 AIRCRAFT

WARNING SYSTEMS  
 0506 0702 0705 0905 3401  
 UF ALARMS  
 COLLISION WARNING DEVICES  
 WARNING DEVICES  
 WARNING SIGNALS  
 GS #WARNING SYSTEMS  
 .EARLY WARNING SYSTEMS  
 ..BALLISTIC MISSILE EARLY WARNING SYSTEM

GS .MINE DETECTORS  
 ACCIDENT PREVENTION  
 AUDITORY SIGNALS  
 AVOIDANCE  
 BELLS  
 CIVIL DEFENSE  
 COLLISION AVOIDANCE  
 DETECTION  
 % DETECTORS  
 DISPLAY DEVICES  
 EXPLOSIONS  
 FALSE ALARMS  
 FIRE PREVENTION  
 FIRES  
 GAS DETECTORS

RT .MINE DETECTORS  
 ACCIDENT PREVENTION  
 AUDITORY SIGNALS  
 AVOIDANCE  
 BELLS  
 CIVIL DEFENSE  
 COLLISION AVOIDANCE  
 DETECTION  
 % DETECTORS  
 DISPLAY DEVICES  
 EXPLOSIONS  
 FALSE ALARMS  
 FIRE PREVENTION  
 FIRES  
 GAS DETECTORS

HAZARDS  
 HEAD-UP DISPLAYS  
 HORNS  
 MONITORS  
 NATIONAL SEVERE STORMS PROJECT  
 POLLUTION MONITORING  
 PROTECTION  
 PUBLIC ADDRESS SYSTEMS  
 SAFETY  
 SAFETY DEVICES  
 SAFETY MANAGEMENT  
 SANITATION  
 SIRENS  
 SOUND GENERATORS  
 % SYSTEMS  
 THREAT EVALUATION

WARPAGE  
 3203  
 RT BENDING  
 BUCKLING  
 CAMBER  
 DAMAGE  
 DEFORMATION  
 DISTORTION  
 GROWTH  
 HEAVING  
 PLASTIC DEFORMATION  
 SHRINKAGE  
 STRUCTURAL STRAIN  
 SURFACE DISTORTION  
 THERMAL EXPANSION  
 TWISTING

% WASHERS  
 1504  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT WASHERS (CLEANERS)  
 WASHERS (SPACERS)

WASHERS (CLEANERS)  
 1504  
 RT CLEANERS  
 CONCENTRATORS  
 EXTRACTION  
 SEPARATORS  
 % WASHERS  
 WASHING

WASHERS (SPACERS)  
 1504  
 GS FASTENERS  
 #WASHERS (SPACERS)

# NASA THESAURUS HIERARCHICAL UPDATE

|                         |                                   |                     |                                          |                                    |
|-------------------------|-----------------------------------|---------------------|------------------------------------------|------------------------------------|
| RT                      | INSERTS                           | RT                  | CHROMIUM ALLOYS                          | WASTE ENERGY UTILIZATION           |
|                         | SEPARATORS                        |                     | COBALT ALLOYS                            | 0301 0602 1503 2205 2304 3301 3303 |
|                         | SPACERS                           |                     | WROUGHT ALLOYS                           | 3304                               |
|                         | % WASHERS                         |                     |                                          | GS                                 |
| WASHINGTON              |                                   | WASTE DISPOSAL      |                                          | UTILIZATION                        |
| 0602 1407               |                                   | 0505 0602 2202 3404 |                                          | #WASTE ENERGY UTILIZATION          |
| UF                      | SCRUBBING                         | GS                  | DISPOSAL                                 | RT                                 |
| GS                      | CLEANING                          |                     | #WASTE DISPOSAL                          | BOILERS                            |
|                         | #WASHING                          |                     | ..COMPOSTING                             | BURNERS                            |
|                         | ..BATHING                         |                     | ..HAZARDOUS MATERIAL DISPOSAL (IN SPACE) | CHIMNEYS                           |
| RT                      | BENEFICIATION                     | RT                  | AIR POLLUTION                            | COGENERATION                       |
|                         | DECONTAMINATION                   |                     | DEEP WELL INJECTION (WASTES)             | ENERGY CONVERSION                  |
|                         | DISSOLVING                        |                     | DEWATERING                               | EXHAUST GASES                      |
|                         | DISTILLATION                      |                     | DILUTION                                 | FURNACES                           |
|                         | ELUTION                           |                     | DISSIPATION                              | HEAT TRANSFER                      |
|                         | FLUSHING                          |                     | DRAINAGE                                 | HEATING                            |
|                         | HOUSEKEEPING (SPACECRAFT)         |                     | EFFLUENTS                                | INCINERATORS                       |
|                         | PURIFICATION                      |                     | ELIMINATION                              | LIGHTING EQUIPMENT                 |
|                         | SCRUBBERS                         |                     | ENVIRONMENT EFFECTS                      | OVENS                              |
| % SEPARATION            |                                   |                     | ENVIRONMENT POLLUTION                    | SOLID WASTES                       |
| WASHERS (CLEANERS)      |                                   |                     | ENVIRONMENT PROTECTION                   | SPACE HEATING (BUILDINGS)          |
| WASTE WATER             |                                   |                     | ENVIRONMENTAL CHEMISTRY                  | WASTE HEAT                         |
|                         |                                   |                     | ENVIRONMENTAL ENGINEERING                | WASTES                             |
| WASHINGTON              |                                   |                     | ENVIRONMENTAL SURVEYS                    |                                    |
| 1305                    |                                   |                     | EXHAUST GASES                            | WASTE HEAT                         |
| GS                      | NATIONS                           |                     | EXHAUST SYSTEMS                          | 3301                               |
|                         | .UNITED STATES                    |                     | GARBAGE                                  | RT                                 |
|                         | #WASHINGTON                       |                     | HUMAN WASTES                             | ENERGY TECHNOLOGY                  |
| RT                      | CASCADE RANGE (CA-OR-WA)          |                     | INCINERATORS                             | HEAT EXCHANGERS                    |
|                         | COLUMBIA RIVER BASIN (ID-OR-WA)   |                     | INDUSTRIAL WASTES                        | HEAT PUMPS                         |
| WASHOUT (RADIOACTIVITY) |                                   |                     | LANDFILLS                                | WASTE ENERGY UTILIZATION           |
| USE FALLOUT             |                                   |                     | MANURES                                  |                                    |
| WASP SOUNDING ROCKET    |                                   |                     | MATERIALS HANDLING                       | WASTE TREATMENT                    |
| 3108                    |                                   |                     | METABOLIC WASTES                         | GS                                 |
| UF                      | HIGH ALTITUDE SOUNDING PROJECTILE |                     | MINES (EXCAVATIONS)                      | #WASTE TREATMENT                   |
|                         | WINDOW ATMOSPHERE SOUNDING        |                     | MODULAR INTEGRATED UTILITY SYSTEM        | .SEWAGE TREATMENT                  |
|                         | PROJECTILE                        |                     | PIPELINES                                | BACTERIA                           |
| GS                      | ROCKET VEHICLES                   |                     | PLASMA CORE REACTORS                     | COMPOSTING                         |
|                         | .MULTISTAGE ROCKET VEHICLES       |                     | POLLUTION                                | GARBAGE                            |
|                         | #WASP SOUNDING ROCKET             |                     | PONDS                                    | RESIDUES                           |
|                         | .SOUNDING ROCKETS                 |                     | RADIOACTIVE WASTES                       | SLUDGE                             |
|                         | #WASP SOUNDING ROCKET             |                     | SANITATION                               | % TREATMENT                        |
| RT                      | LOKI ROCKET VEHICLE               |                     | SEWAGE TREATMENT                         | WASTES                             |
|                         | SOLID PROPELLANT ROCKET ENGINES   |                     | SEWERS                                   |                                    |
| WASPALOY                |                                   |                     | SOLID WASTES                             | WASTE UTILIZATION                  |
| 1501 1701 1704          |                                   |                     | SPACE FLIGHT FEEDING                     | 0505 0602 3404                     |
| GS                      | ALLOYS                            |                     | % STORAGE                                | GS                                 |
|                         | .HEAT RESISTANT ALLOYS            |                     | SUMPS                                    | UTILIZATION                        |
|                         | #WASPALOY                         |                     | TOILETS                                  | #WASTE UTILIZATION                 |
|                         | .NICKEL ALLOYS                    |                     | UTILITIES                                | RT                                 |
|                         | #WASPALOY                         |                     | WASTES                                   | BIOMASS ENERGY PRODUCTION          |
|                         |                                   |                     | WATER POLLUTION                          | COMPOSTING                         |
|                         |                                   |                     |                                          | HYDROCARBON FUEL PRODUCTION        |
|                         |                                   |                     |                                          | INDUSTRIAL WASTES                  |
|                         |                                   |                     |                                          | LANDFILLS                          |
|                         |                                   |                     |                                          | MANURES                            |
|                         |                                   |                     |                                          | SOLID WASTES                       |
|                         |                                   |                     |                                          | WASTES                             |
|                         |                                   |                     |                                          | WASTE WATER                        |

[illegible]

[illegible]

|       |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT    | GAS INJECTION<br>PERFORATING<br>THRUST AUGMENTATION                                                                                                                                                                                                                                                              | LAKE HURON<br>LAKE MICHIGAN<br>LAKE ONTARIO<br>LAKE SUPERIOR<br>LIMNOLOGY<br>POTABLE WATER<br>PYRAMID LAKE (NV)<br>WATERSHEDS                                                                                                                                                                                                                                                                                                              | PHYTOPLANKTON<br>POLLUTION MONITORING<br>POLLUTION TRANSPORT<br>PURITY<br>THERMAL POLLUTION<br>WASTE DISPOSAL                                                                                                                                                  |
| %     | WATER INTAKES<br>O404 O408 O505<br>SN (USE OF A MORE SPECIFIC TERM IS<br>RECOMMENDED--CONSULT THE TERMS<br>LISTED BELOW)                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
| RT    | AIR INTAKES<br>INTAKE SYSTEMS<br>MANIFOLDS<br>NOSE INLETS<br>PLENUM CHAMBERS<br>SCOOPS<br>SIDE INLETS                                                                                                                                                                                                            | WATER MASERS<br>1601<br>GS<br>EMISSION<br>#WATER MASERS<br>STIMULATED EMISSION DEVICES<br>MASERS<br>#WATER MASERS<br>GAS LASERS<br>GAS MASERS<br>INTERSTELLAR MASERS<br>MASER OUTPUTS                                                                                                                                                                                                                                                      | WATER PRESSURE<br>1202 1204 1408<br>GS<br>PRESSURE<br>FLUID PRESSURE<br>WATER PRESSURE<br>RT %<br>HYDRAULICS<br>HYDRODYNAMICS<br>HYDROSTATIC PRESSURE<br>HYDROSTATICS<br>INLET PRESSURE<br>PIPE FLOW                                                           |
| WATER | JETS<br>USE HYDRAULIC JETS                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                            | WATER PURIFICATION<br>USE WATER TREATMENT                                                                                                                                                                                                                      |
| WATER | LANDING<br>O203 3105<br>GS<br>LANDING<br>#WATER LANDING<br>DITCHING (LANDING)<br>AIRCRAFT LANDING<br>CRASH LANDING<br>GLIDE LANDING<br>HARD LANDING<br>HORIZONTAL SPACECRAFT LANDING<br>HYDROPLANING<br>PLANETARY LANDING<br>SOFT LANDING<br>SPACECRAFT LANDING<br>SPACECRAFT RECOVERY<br>SPLASHING<br>TOUCHDOWN | WATER MODERATED REACTORS<br>2203 2204<br>GS<br>NUCLEAR REACTORS<br>#WATER MODERATED REACTORS<br>EXPERIMENTAL BOILING WATER<br>REACTORS<br>HEAVY WATER COMPONENTS TEST<br>REACTORS<br>PLUTONIUM RECYCLE TEST REACTOR<br>LIGHT WATER REACTORS                                                                                                                                                                                                | WATER QUALITY<br>1306 1308<br>GS<br>QUALITY<br>ENVIRONMENTAL QUALITY<br>WATER QUALITY<br>ALKALINITY<br>ENVIRONMENT EFFECTS                                                                                                                                     |
| WATER | LOSS<br>O603 2003<br>RT DEHYDRATION<br>DRYING<br>EVAPORATION<br>LOSSES                                                                                                                                                                                                                                           | WATER POLLUTION<br>O411 O505 O504<br>GS<br>POLLUTION<br>ENVIRONMENT POLLUTION<br>WATER POLLUTION<br>OIL POLLUTION<br>ALGAE<br>ALKALINITY<br>BIOCHEMICAL OXYGEN DEMAND<br>CLEAN ENERGY<br>CONTAMINATION<br>DROUGHT<br>ENVIRONMENT EFFECTS<br>ENVIRONMENT PROTECTION<br>ENVIRONMENTAL CHEMISTRY<br>ENVIRONMENTAL QUALITY<br>ENVIRONMENTAL SURVEYS<br>INLAND WATERS<br>LANDFILLS<br>LIMNOLOGY<br>LYSIMETERS<br>MARINE RESOURCES<br>OIL SLICKS | WATER RECLAMATION<br>O505 O602<br>UF<br>WATER RECOVERY<br>RECLAMATION<br>MATERIALS RECOVERY<br>WATER RECLAMATION<br>CONSERVATION<br>DEWATERING<br>DROUGHT<br>POLLUTION                                                                                         |
| WATER | MANAGEMENT<br>O505 3404<br>GS<br>MANAGEMENT<br>#WATER MANAGEMENT<br>RT<br>CONSERVATION<br>DROUGHT<br>ENVIRONMENT MANAGEMENT<br>FLOODS<br>HYDROLOGY<br>LAKE ERIE                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                            | WATER RECOVERY<br>USE WATER RECLAMATION<br>WATER RESOURCES<br>O505 1306 3404<br>GS<br>RESOURCES<br>EARTH RESOURCES<br>WATER RESOURCES<br>AQUIFERS<br>ENVIRONMENT EFFECTS<br>ENVIRONMENT MANAGEMENT<br>GREAT LAKES (NORTH AMERICA)<br>GROUND WATER<br>HYDROLOGY |



# NASA THESAURUS HIERARCHICAL UPDATE

INLAND WATERS  
INTERNATIONAL HYDROLOGICAL DECADE  
LAKES  
LIMNOLOGY  
OCEANS  
PONDS  
POTABLE WATER  
PRECIPITATION (METEOROLOGY)  
PYRAMID LAKE (NV)  
RAINMAKING  
RESERVOIRS  
SEA WATER  
UNDERWATER RESOURCES  
WETLANDS  
WINDPOWERED PUMPS

MONOPLANES  
PASSENGER AIRCRAFT  
RECONNAISSANCE AIRCRAFT  
S-61 HELICOPTER  
SEA LAUNCHING  
SUBMERSIBLE AIRCRAFT  
% SUBSONIC AIRCRAFT  
TRANSPORT AIRCRAFT  
UTILITY AIRCRAFT

% TESTS  
WATER WAVES  
WIND TUNNEL TESTS  
WATER TUNNELS  
USE HYDRAULIC TEST TUNNELS

WATER RUNOFF  
1306  
RT  
DRAINAGE  
GROUND WATER  
INLAND WATERS  
RESOURCES MANAGEMENT  
RIVERS  
WADIS

WATER TEMPERATURE  
2003 2311 3303 3304 3408  
GS  
TEMPERATURE  
#WATER TEMPERATURE  
...OCEAN TEMPERATURE  
...SEA SURFACE TEMPERATURE  
RT SURFACE TEMPERATURE  
TEMPERATURE DISTRIBUTION  
THERMAL POLLUTION

WATER VAPOR  
1203 1204 2003  
GS  
VAPORS  
#WATER VAPOR  
RT ATMOSPHERIC MOISTURE  
DEW  
HUMIDITY  
MIXING RATIOS  
MOISTURE  
MOISTURE CONTENT  
STEAM

WATER SPLITTING  
0301  
RT  
ELECTROLYSIS  
HYDROGEN FUELS  
HYDROGEN PRODUCTION  
SPLITTING  
THERMOCHEMISTRY  
WATER

WATER TREATMENT  
0505 0602 3404  
UF WATER PURIFICATION  
RT ACTIVATED CARBON  
ADSORPTION  
AERATION  
AGITATION  
BENTONITE  
BIOCHEMICAL OXYGEN DEMAND  
CHLORINATION  
COAGULATION  
CONTAMINANTS  
CORROSION PREVENTION  
DEMINERALIZING  
DESALINIZATION  
FILTRATION  
FLOCCULATING  
FLOTATION  
ION EXCHANGING  
MATERIAL ABSORPTION  
POLLUTION  
POTABLE WATER  
PURIFICATION  
% SCREENING  
SETTLING  
SEWAGE  
% TREATMENT

WATER VEHICLES  
1204  
GS  
#WATER VEHICLES  
...BOATS  
...LIFEBOATS  
...CAPTURED AIR BUBBLE VEHICLES  
...SHIPS  
...ADVANCED RANGE INSTRUMENTATION  
SHIP  
...AIRCRAFT CARRIERS  
...CARGO SHIPS  
...SAVANNAH NUCLEAR SHIP  
...TANKER SHIPS  
...NUCLEAR POWERED SHIPS  
...SAVANNAH NUCLEAR SHIP  
...SATELLITE COMMUNICATIONS SHIPS  
...SUBMARINES  
...BALLISTIC MISSILE SUBMARINES  
...GUIDED MISSILE SUBMARINES  
...TRIDENT SUBMARINE  
...SURFACE EFFECT SHIPS  
...SWATH (SHIP)  
...UNDERWATER VEHICLES  
...SUBMARINES  
...BALLISTIC MISSILE SUBMARINES  
...GUIDED MISSILE SUBMARINES  
...TRIDENT SUBMARINE  
...UNDERWATER RESEARCH LABORATORIES

WATER TUNNEL TESTS  
1204  
RT  
AIR WATER INTERACTIONS  
CROSS FLOW  
FLOW DISTRIBUTION  
FLOW VISUALIZATION  
STRAKES

WATER TUNNELS  
USE HYDRAULIC TEST TUNNELS

WATER TABLES  
1306 1308  
RT  
AQUIFERS  
DRAINAGE  
GROUND WATER  
POTABLE WATER  
SPRINGS (WATER)  
VADOSE WATER  
WATERSHEDS

WATER TUNNELS  
USE HYDRAULIC TEST TUNNELS

WATER TAKEOFF AND LANDING AIRCRAFT  
0201  
GS  
#WATER TAKEOFF AND LANDING AIRCRAFT  
...SEAPLANES  
RT % AIRCRAFT

WATER TUNNEL TESTS  
1204  
RT  
AIR WATER INTERACTIONS  
CROSS FLOW  
FLOW DISTRIBUTION  
FLOW VISUALIZATION  
STRAKES

AMPHIBIOUS AIRCRAFT  
ANTISUBMARINE WARFARE AIRCRAFT  
COMMERCIAL AIRCRAFT  
GROUND EFFECT MACHINES  
HOVERCRAFT GROUND EFFECT MACHINES  
LIGHT AIRCRAFT

AMPHIBIOUS VEHICLES  
HARBORS  
MARINE TRANSPORTATION  
% MILITARY VEHICLES  
RESEARCH VEHICLES  
SHIPYARDS  
SURFACE VEHICLES  
% VEHICLES

WATER WAVES  
 1204 1310  
 GS #WATER WAVES  
 RT BREAKWATERS  
 CAPILLARY WAVES  
 CNOIDAL WAVES  
 ELASTOHYDRODYNAMICS  
 FRONTAL WAVES  
 GRAVITY WAVES  
 HYDRODYNAMIC COEFFICIENTS  
 LITTORAL TRANSPORT  
 OCEAN DYNAMICS  
 RIPPLES  
 SEA ROUGHNESS  
 SEA STATES  
 SURFACE WAVES  
 TSUNAMI WAVES  
 WATER TUNNEL TESTS  
 WATERWAVE ENERGY  
 WATERWAVE ENERGY CONVERSION  
 WATERWAVE POWERED MACHINES  
 % WAVES

WATER WHEELS  
 0902 0904 2304  
 GS WHEELS  
 RT #WATER WHEELS  
 HYDROELECTRIC POWER STATIONS  
 TURBINE WHEELS

WATERFOWL  
 0402  
 GS ANIMALS  
 . VERTEBRATES  
 .. BIRDS  
 .. #WATERFOWL  
 BEACHES  
 COASTAL ECOLOGY  
 MARINE BIOLOGY  
 MARINE ENVIRONMENTS  
 MARSHLANDS  
 MIGRATION  
 OCEANOGRAPHY  
 WETLANDS

WATERPROOFING  
 0508 0602 1802  
 RT BARRIER LAYERS  
 CAULKING  
 COATINGS  
 INSULATION  
 MOISTURE RESISTANCE  
 PROTECTIVE COATINGS

SEALING  
 WEATHERPROOFING

WATERSHEDS  
 1301 1308  
 UF CATCHMENT AREAS  
 GS LANDFORMS  
 . STRUCTURAL BASINS  
 . #WATERSHEDS  
 RT DIVIDES (LANDFORMS)  
 DRAINAGE PATTERNS  
 FLOOD CONTROL  
 FLOODS  
 HYDROGEOLOGY  
 HYDROLOGY  
 INTERNATIONAL HYDROLOGICAL DECADE  
 MISSOURI RIVER BASIN (US)  
 MOUNTAINS  
 PONDS  
 PRECIPITATION (METEOROLOGY)  
 RAIN  
 RIVER BASINS  
 RIVERS  
 STORMS (METEOROLOGY)  
 VALLEYS  
 WATER  
 WATER FLOW  
 WATER MANAGEMENT  
 WATER TABLES

WATERWAVE ENERGY  
 0301 1310 2308 2311  
 RT CLEAN ENERGY  
 EARTH RESOURCES  
 % ENERGY  
 OCEANOGRAPHY  
 TIDEPOWER  
 WATER WAVES  
 % WAVES

WATERWAVE ENERGY CONVERSION  
 1301 1302 1310  
 GS ENERGY CONVERSION  
 #WATERWAVE ENERGY CONVERSION  
 RT % CONVERSION  
 EARTH RESOURCES  
 ENERGY CONVERSION EFFICIENCY  
 % ENERGY SOURCES  
 OCEAN CURRENTS  
 OCEAN SURFACE  
 OCEANOGRAPHY  
 OCEANS  
 SEA ROUGHNESS  
 TIDE POWERED GENERATORS  
 TIDE POWERED MACHINES

TIDEPOWER  
 TIDES  
 WATER WAVES

WATERWAVE POWERED MACHINES  
 1310 1504 2318 3404  
 RT % MACHINERY  
 OCEAN CURRENTS  
 OCEAN SURFACE  
 SEA ROUGHNESS  
 TIDE POWERED GENERATORS  
 TIDE POWERED MACHINES  
 TIDEPOWER  
 TIDES  
 WATER WAVES

WATERWAYS  
 1103  
 GS #WATERWAYS  
 . CANALS  
 . HARBORS  
 .. ARTIFICIAL HARBORS  
 LAKES  
 RT RIVERS  
 STRAITS

WATTMETERS  
 0904 0905 1406  
 GS MEASURING INSTRUMENTS  
 #WATTMETERS  
 RT ELECTRICAL MEASUREMENT  
 ELECTROMETERS

WAVE AMPLIFICATION  
 0703 0710  
 GS AMPLIFICATION  
 #WAVE AMPLIFICATION  
 RT BAROCLINIC WAVES  
 ELECTROMAGNETIC RADIATION  
 % WAVES

WAVE ATTENUATION  
 0710 1202 2306 2309 2312 2502  
 GS ATTENUATION  
 #WAVE ATTENUATION  
 .. ACOUSTIC ATTENUATION  
 ... SHOCK WAVE ATTENUATION  
 .. RADAR ATTENUATION  
 .. RADIO ATTENUATION  
 ATMOSPHERIC ATTENUATION  
 ELECTROMAGNETIC ABSORPTION  
 ELECTROMAGNETIC MISSILES  
 INFRARED ABSORPTION  
 RADAR TRANSMISSION  
 RADIO TRANSMISSION

# NASA THESAURUS HIERARCHICAL UPDATE

## SHOCK WAVE PROPAGATION

### WAVE DEGRADATION

1202 1203 3203  
 GS DEGRADATION  
 #WAVE DEGRADATION  
 RT ATTENUATION  
 ELECTROMAGNETIC MISSILES  
 SCATTERING  
 SHOCK WAVE INTERACTION

### WAVE DIFFRACTION

0710 2306 2402  
 GS DIFFRACTION  
 #WAVE DIFFRACTION  
 RT ATTENUATION  
 CROSSTALK  
 DIFFRACTION RADIATION  
 FRESNEL INTEGRALS  
 GEOMETRICAL THEORY OF DIFFRACTION  
 % INTERFERENCE  
 TRAVELING WAVE MODULATION

### WAVE DISPERSION

0710 2306  
 RT ACUSTIC PROPERTIES  
 ATMOSPHERIC REFRACTION  
 ATTENUATION  
 % COHERENCE  
 COLOR  
 DEFLECTION  
 DIFFRACTION  
 % DISPERSION

### ELASTIC WAVES

ELECTROMAGNETIC RADIATION  
 FADING  
 LIGHT TRANSMISSION  
 OPTICAL PATHS  
 OPTICAL PROPERTIES  
 RADIATION DISTRIBUTION  
 RADIO WAVE REFRACTION  
 REFRACTION  
 SCATTERING  
 SOUND-SOUND INTERACTIONS  
 TRANSMISSION  
 TRANSMISSION LOSS

### WAVE DRAG

0101 1203 3501  
 GS DYNAMIC CHARACTERISTICS  
 .DRAG  
 ..PRESSURE DRAG  
 ...#WAVE DRAG  
 ....INTERFERENCE DRAG  
 RT FRICTION DRAG

## SUPERSONIC DRAG

### WAVE EQUATIONS

0710 1202 2301 2306 2309 2312 2402  
 2502 3203  
 SN (NOT EQUATIONS OF MOTION)  
 GS #WAVE EQUATIONS  
 .DIRAC EQUATION  
 .EIKONAL EQUATION  
 .KLEIN-GORDON EQUATION  
 .KORTEWEG-DEVRIES EQUATION  
 .LAME WAVE EQUATIONS  
 .SCHROEDINGER EQUATION  
 RT BOLTZMANN-VLASOV EQUATION  
 DENSITY WAVE MODEL  
 % EQUATIONS  
 FORBIDDEN BANDS  
 % HELMHOLTZ EQUATIONS  
 HYPERBOLIC DIFFERENTIAL EQUATIONS  
 PARTIAL DIFFERENTIAL EQUATIONS  
 QUANTUM THEORY

### WAVE EXCITATION

1202 1203 2306 2402 2502 3203  
 GS EXCITATION  
 #WAVE EXCITATION  
 ..ACUSTIC EXCITATION  
 ..HARMONIC EXCITATION  
 RT DIFFRACTION RADIATION  
 STROKING TESTS  
 % WAVES

### WAVE FRONT DEFORMATION

0710 1202 1203 2306 2310 3203  
 GS DEFORMATION  
 #WAVE FRONT DEFORMATION  
 RT % INTERFERENCE

### WAVE FRONT RECONSTRUCTION

0710 1202 1203 2310 3203  
 GS RECONSTRUCTION  
 #WAVE FRONT RECONSTRUCTION  
 RT ACOUSTICAL HOLOGRAPHY  
 DIFFRACTOMETERS  
 HOLOGRAPHIC INTERFEROMETRY  
 HOLOGRAPHIC SPECTROSCOPY  
 HOLOGRAPHY  
 KINOFORM  
 MICROWAVE HOLOGRAPHY  
 PHOTOGRAPHY  
 WHITE LIGHT HOLOGRAPHY

### WAVE FRONTS

1202 1203 1204 2306 2310  
 GS #WAVE FRONTS

## SHOCK FRONTS

CAUSTIC LINES  
 EIKONAL EQUATION  
 % FRONTS  
 HUYGENS PRINCIPLE  
 PHASE COHERENCE  
 PHASE VELOCITY  
 SHOCK DISCONTINUITY  
 % WAVES

### WAVE FUNCTIONS

0710 1202 2306 2310 2402 3203  
 GS #WAVE FUNCTIONS  
 .MOLECULAR ORBITALS  
 .PAULI EXCLUSION PRINCIPLE  
 FORBIDDEN TRANSITIONS  
 HARTREE APPROXIMATION  
 PERTURBATION THEORY  
 SQUARE WAVES  
 TIME FUNCTIONS

### WAVE GENERATION

1308 2402 2403 2502  
 RT ELECTROMAGNETIC RADIATION  
 FUNCTION GENERATORS  
 % GENERATORS  
 HARMONIC GENERATIONS  
 SHOCK WAVE GENERATORS

### WAVE INCIDENCE CONTROL

0710 2306 2402  
 RT % CONTROL  
 INCIDENT RADIATION

### WAVE INTERACTION

2301 2306 2309 2402 2502  
 GS #WAVE INTERACTION  
 .SHOCK WAVE INTERACTION  
 .WAVE-PARTICLE INTERACTIONS  
 RT ACOUSTIC COUPLING  
 COUPLING  
 DAMPING  
 ELECTROACOUSTIC WAVES  
 ELECTROMAGNETIC INTERACTIONS  
 FOUR-WAVE MIXING  
 % INTERACTIONS

### INTERMODULATION

MODULATION  
 ORTHOGONAL MULTIPLEXING THEORY  
 PLASMA INTERACTIONS  
 PROPAGATION MODES  
 SCATTERING  
 SHOCK WAVE LUMINESCENCE  
 SHOCK WAVE PROFILES  
 SHOCK WAVE PROPAGATION

[illegible]

## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

|                                    |                                     |                                |
|------------------------------------|-------------------------------------|--------------------------------|
| REFRACTED WAVES                    | #WEAK INTERACTIONS (FIELD THEORY)   | .SENTINEL SYSTEM               |
| SEISMIC WAVES                      | NUCLEAR REACTIONS                   | .SUCCESS PROJECT               |
| SH WAVES                           | .NUCLEAR INTERACTIONS               | .TYPHON WEAPON SYSTEM          |
| SHOCK WAVES                        | .#WEAK INTERACTIONS (FIELD THEORY)  | .WEAPON SYSTEM 107A-1          |
| SINE WAVES                         | PARTICLE INTERACTIONS               | .WEAPON SYSTEM 107A-2          |
| SOUND WAVES                        | .ELEMENTARY PARTICLE INTERACTIONS   | .WEAPON SYSTEM 133A            |
| SPHERICAL WAVES                    | .WEAK ENERGY INTERACTIONS           | .WEAPON SYSTEM 133B            |
| SQUARE WAVES                       | ..#WEAK INTERACTIONS (FIELD THEORY) | .WEAPON SYSTEM 315A            |
| STANDING WAVES                     | .NUCLEAR INTERACTIONS               | RT                             |
| STRESS WAVES                       | .#WEAK INTERACTIONS (FIELD THEORY)  | AIR TO SURFACE MISSILES        |
| SURFACE WAVES                      | GRAND UNIFIED THEORY                | ANTISHIP MISSILES              |
| SURGES                             | RT                                  | FIRE CONTROL                   |
| TIDAL WAVES                        | % INTERACTIONS                      | HARPOON MISSILE                |
| TRANSVERSE WAVES                   | STRONG INTERACTIONS (FIELD THEORY)  | % MILITARY AIRCRAFT            |
| TROPOSPHERIC WAVES                 | % THEORIES                          | MILITARY SPACECRAFT            |
| VIBRATION                          | WEAPON SYSTEM MANAGEMENT            | MISSILE LAUNCHERS              |
| WATER WAVES                        | 3401 3406                           | MISSILES                       |
| WATERWAVE ENERGY                   | GS                                  | MOBILE MISSILE LAUNCHERS       |
| WAVE AMPLIFICATION                 | .#WEAPON SYSTEM MANAGEMENT          | NUCLEAR WEAPONS                |
| WAVE EXCITATION                    | RT                                  | ORDNANCE                       |
| WAVE FRONTS                        | % PROJECT MANAGEMENT                | PANAVIA MILITARY AIRCRAFT      |
| WAVELET ANALYSIS                   | % SYSTEMS                           | % ROCKETS                      |
|                                    | WEAPON SYSTEM 107A-1                | SPACE WEAPONS                  |
| WAXES                              | 3401                                | % SYSTEMS                      |
| 1802 1805 1808                     | GS                                  | WEAPONS                        |
| GS #WAXES                          | WEAPON SYSTEMS                      | WEAPONS DEVELOPMENT            |
| .CERESIN                           | #WEAPON SYSTEM 107A-1               |                                |
| ALKANES                            | WEAPON SYSTEM 107A-2                | WEAPONS                        |
| COATINGS                           | 3401                                | 3302 3401                      |
| CRUDE OIL                          | GS                                  | GS #WEAPONS                    |
| FINISHES                           | WEAPON SYSTEMS                      | .GUNS (ORDNANCE)               |
| PHASE CHANGE MATERIALS             | #WEAPON SYSTEM 107A-2               | ..ARTILLERY                    |
|                                    | WEAPON SYSTEM 133A                  | ...HOWITZERS                   |
| WEAK ENERGY INTERACTIONS           | 3401                                | ..RIFLES                       |
| 2403                               | GS                                  | .LASER WEAPONS                 |
| GS                                 | WEAPON SYSTEMS                      | .MINES (ORDNANCE)              |
| DECAY                              | #WEAPON SYSTEM 133A                 | .NUCLEAR WEAPONS               |
| #WEAK ENERGY INTERACTIONS          | WEAPON SYSTEM 133B                  | ..FISSION WEAPONS              |
| ..WEAK INTERACTIONS (FIELD THEORY) | 3401                                | ..FUSION WEAPONS               |
| PARTICLE INTERACTIONS              | GS                                  | .SPACE WEAPONS                 |
| .ELEMENTARY PARTICLE INTERACTIONS  | WEAPON SYSTEMS                      | .WARHEADS                      |
| .#WEAK ENERGY INTERACTIONS         | #WEAPON SYSTEM 133B                 | ..NUCLEAR WARHEADS             |
| ..WEAK INTERACTIONS (FIELD THEORY) | WEAPON SYSTEM 315A                  | ..PRECISION GUIDED PROJECTILES |
| BETA PARTICLES                     | 3401                                | RT                             |
| GRAND UNIFIED THEORY               | GS                                  | AMMUNITION                     |
| GRAVITINOS                         | #WEAPON SYSTEMS                     | ANTIQUITIES                    |
| % INTERACTIONS                     | #WEAPON SYSTEM 315A                 | ANTISHIP WARFARE               |
| PARTICLE THEORY                    | WEAPON SYSTEMS                      | ARMED FORCES (FOREIGN)         |
|                                    | 2205 3302 3401                      | ARMED FORCES (UNITED STATES)   |
| WEAK INTERACTIONS (FIELD THEORY)   | GS                                  | % BALLISTIC VEHICLES           |
| 1902 3009                          | #WEAPON SYSTEMS                     | DISARMAMENT                    |
| UF BETA INTERACTIONS               | .GROUND OPERATIONAL SUPPORT SYSTEM  | FIRE CONTROL                   |
| GS                                 | .LASER WEAPONS                      | GUNNERY TRAINING               |
| DECAY                              | .MISSILE SYSTEMS                    | MILITARY TECHNOLOGY            |
| .WEAK ENERGY INTERACTIONS          | .NIKE X SYSTEMS                     | MISSILES                       |
| .#WEAK INTERACTIONS (FIELD THEORY) | ..SAFE GUARD SYSTEM                 | ORDNANCE                       |
| FIELD THEORY (PHYSICS)             |                                     | PATRIOT MISSILE                |

## NASA THESAURUS HIERARCHICAL UPDATE

|                              |                   |
|------------------------------|-------------------|
| PROJECTILES                  | REMOVAL           |
| SHAPED CHARGES               | SCORING           |
| SRAPNEL                      | SLIDING FRICTION  |
| TANKS (COMBAT VEHICLES)      | SPALLING          |
| TOMAHAWK MISSILES            | SURFACE FINISHING |
| TORPEDOES                    | % SURFACES        |
| WEAPON SYSTEMS               | SYSTEM FAILURES   |
| WEAPONS DELIVERY             | TRIBOLOGY         |
| WING-FUSELAGE STORES         | WEAR RESISTANCE   |
| WEAPONS DELIVERY             | WEAR INHIBITORS   |
| 3406                         | 1503 1702         |
| GS                           | GS INHIBITORS     |
| DELIVERY                     | #WEAR INHIBITORS  |
| #WEAPONS DELIVERY            | RT RETARDANTS     |
| RT AIR DEFENSE               | WEAR RESISTANCE   |
| % AIRCRAFT                   |                   |
| DEFENSE PROGRAM              |                   |
| MILITARY TECHNOLOGY          |                   |
| MISSILE DEFENSE              |                   |
| NUCLEAR WEAPONS              |                   |
| % ROCKETS                    |                   |
| SPACE WEAPONS                |                   |
| WEAPONS                      |                   |
| WEAPONS DEVELOPMENT          |                   |
| 1106 3401 3404               |                   |
| GS PRODUCT DEVELOPMENT       |                   |
| #WEAPONS DEVELOPMENT         |                   |
| RESEARCH AND DEVELOPMENT     |                   |
| WEAPON SYSTEMS               |                   |
| WEAPONS INDUSTRY             |                   |
| 3401 3404                    |                   |
| GS INDUSTRIES                |                   |
| .DEFENSE INDUSTRY            |                   |
| .#WEAPONS INDUSTRY           |                   |
| ARMED FORCES (UNITED STATES) |                   |
| MILITARY TECHNOLOGY          |                   |
| RT                           |                   |
| WEAR                         |                   |
| 1306 1503 1702               |                   |
| RT ABRASION                  |                   |
| CHIPPING                     |                   |
| CORROSION                    |                   |
| DAMAGE                       |                   |
| DEPRECIATION                 |                   |
| DETERRIORATION               |                   |
| DURABILITY                   |                   |
| EROSION                      |                   |
| FAILURE                      |                   |
| FLAKING                      |                   |
| FRETTING CORROSION           |                   |
| FRICTION                     |                   |
| GRINDING (MATERIAL REMOVAL)  |                   |
| HARDNESS                     |                   |
| WEATHER                      |                   |
| 2001 2002 2003               |                   |
| UF WEATHER CONDITIONS        |                   |
| GS #WEATHER                  |                   |
| WEATHER FORECASTING          |                   |
| 1301 2001 2003               |                   |

GS FORECASTING  
 #WEATHER FORECASTING  
 ..LONG RANGE WEATHER FORECASTING  
 ..NOWCASTING  
 ..NUMERICAL WEATHER FORECASTING  
 ..STATISTICAL WEATHER FORECASTING  
 METEOROLOGY  
 #WEATHER FORECASTING  
 ..LONG RANGE WEATHER FORECASTING  
 ..NOWCASTING  
 ..NUMERICAL WEATHER FORECASTING  
 ..STATISTICAL WEATHER FORECASTING  
 RT AIR MASSES  
 ATMOSPHERIC MODELS  
 CIRRUS SHIELDS  
 CLOUD COVER  
 CLOUD FRONTS  
 ENVIRONMENTAL MONITORING  
 FLIGHT CONDITIONS  
 FLOOD PREDICTIONS  
 GARP ATLANTIC TROPICAL EXPERIMENT  
 HUMIDITY  
 METEOROLOGICAL BALLOONS  
 METEOROLOGICAL FLIGHT  
 METEOROLOGICAL RADAR  
 METEOROLOGICAL SATELLITES  
 METEOROLOGICAL SERVICES  
 NEPHANALYSIS  
 PRECIPITATION (METEOROLOGY)  
 SNOWSTORMS  
 STORMS  
 STORMS (METEOROLOGY)  
 SYNOPTIC METEOROLOGY  
 WARM FRONTS  
 WIND (METEOROLOGY)  
 WEATHER FRONTS  
 USE FRONTS (METEOROLOGY)  
 WEATHER MAPS  
 USE METEOROLOGICAL CHARTS  
 WEATHER MODIFICATION  
 1301 1302 2001 2003 2311  
 UF WEATHER CONTROL  
 GS #WEATHER MODIFICATION  
 .CLOUD DISPERSAL  
 .CLOUD SEEDING  
 .FOG DISPERSAL  
 .LIGHTNING SUPPRESSION  
 .RAINMAKING  
 .STORM ENHANCEMENT  
 .STORM SUPPRESSION  
 ARTIFICIAL CLOUDS  
 CLOUD PHYSICS  
 RT  
 % CONTROL  
 ENVIRONMENTAL CONTROL  
 HEAT ISLANDS  
 SNOWSTORMS  
 WEATHER RADAR  
 USE METEOROLOGICAL RADAR  
 WEATHER RECONNAISSANCE AIRCRAFT  
 0201  
 GS RECONNAISSANCE AIRCRAFT  
 #WEATHER RECONNAISSANCE AIRCRAFT  
 RT % AIRCRAFT  
 GLOBAL ATMOSPHERIC RESEARCH PROGRAM  
 METEOROLOGICAL INSTRUMENTS  
 OBSERVATION AIRCRAFT  
 RB-50 AIRCRAFT  
 WEATHER STATIONS  
 1101 1106 2001 2003  
 UF METEOROLOGICAL STATIONS  
 GS STATIONS  
 #WEATHER STATIONS  
 ..AUTOMATIC WEATHER STATIONS  
 RT GROUND STATIONS  
 INSTRUMENT PACKAGES  
 INTEGRATED GLOBAL OCEAN STATION  
 SYSTEMS  
 METEOROLOGICAL INSTRUMENTS  
 METEOROLOGICAL SATELLITES  
 METEOROLOGICAL SERVICES  
 OCEAN DATA ACQUISITIONS SYSTEMS  
 WEATHERING  
 1306 1503 1702 2001 2003  
 RT CORROSION  
 CORROSION TESTS  
 CURING  
 DAMAGE  
 DEGRADATION  
 DETERIORATION  
 EARTH ATMOSPHERE  
 EROSION  
 EXPOSURE  
 MECHANICAL PROPERTIES  
 RUSTING  
 SOIL EROSION  
 WEATHERPROOFING  
 0602 1802 2001  
 RT COATINGS  
 COLD WEATHER  
 CORROSION PREVENTION  
 MOISTURE RESISTANCE  
 PACKAGING  
 RT  
 WEAVING  
 1504 1811  
 RT FABRICS  
 SEWING  
 WOVEN COMPOSITES  
 WEBBING  
 2802 2805  
 RT FABRICS  
 MESH  
 % WEBS  
 WEBS (SHEETS)  
 WEBER TEST  
 1307 2308  
 GS PHYSIOLOGICAL TESTS  
 #WEBER TEST  
 RT AUDITORY PERCEPTION  
 BINAURAL HEARING  
 WEBER-FECHNER LAW  
 0404 0408  
 GS LAWS  
 #WEBER-FECHNER LAW  
 % WEBS  
 2802  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT MEMBRANES  
 MESH  
 WEBBING  
 WEBS (SHEETS)  
 WEBS (SUPPORTS)  
 WEBS (MEMBRANES)  
 USE MEMBRANES  
 WEBS (SHEETS)  
 1504  
 SN (EXCLUDES POLYMERIC FILMS AND  
 STRUCTURAL REINFORCEMENTS)  
 RT DIAPHRAGMS (MECHANICS)  
 ELASTIC SHEETS  
 FABRICS  
 % FILMS  
 MEMBRANES  
 PAPER (MATERIAL)  
 PAPERS  
 % ROVINGS  
 % SHEETS



# NASA THESAURUS HIERARCHICAL UPDATE

WEBBING  
 WEBS (SUPPORTS)  
 WEBS (SUPPORTS)  
 1504  
 GS #WEBS (SUPPORTS)  
 .GIRDER WEBS  
 RT DIAPHRAGMS (MECHANICS)  
 ELASTIC SHEETS  
 MEMBRANE STRUCTURES  
 MEMBRANES  
 RIBS (SUPPORTS)  
 SKIN (STRUCTURAL MEMBER)  
 STIFFENING  
 WEBS (SHEETS)  
 WEDGE FLOW  
 O101 O102 1202 1203  
 GS FLUID FLOW  
 #WEDGE FLOW  
 RT BLASIUS FLOW  
 CONICAL FLOW  
 FALKNER-SKAN EQUATION  
 FLOW GEOMETRY  
 LAMINAR FLOW  
 SHOCK WAVES  
 SUPERSONIC FLOW  
 THREE DIMENSIONAL FLOW  
 TWO DIMENSIONAL FLOW  
 VISCOUS FLOW  
 WEDGES  
 O101 O102 3203  
 RT AERODYNAMIC CONFIGURATIONS  
 AIRFOIL PROFILES  
 AIRFOILS  
 WEIBEL INSTABILITY  
 2501  
 GS DYNAMIC CHARACTERISTICS  
 .DYNAMIC STABILITY  
 ..MOTION STABILITY  
 ...FLOW STABILITY  
 ....MAGNETOHYDRODYNAMIC STABILITY  
 ....#WEIBEL INSTABILITY  
 ..FLOW CHARACTERISTICS  
 ....#WEIBEL INSTABILITY  
 ...MAGNETOHYDRODYNAMIC STABILITY  
 ....#WEIBEL INSTABILITY  
 STABILITY  
 .DYNAMIC STABILITY  
 ..MOTION STABILITY  
 ...FLOW STABILITY  
 ....MAGNETOHYDRODYNAMIC STABILITY  
 ....#WEIBEL INSTABILITY  
 RT PLASMA INTERACTIONS  
 WEIBULL DENSITY FUNCTIONS  
 1505 1905  
 GS FUNCTIONS (MATHEMATICS)  
 .PROBABILITY DENSITY FUNCTIONS  
 .#WEIBULL DENSITY FUNCTIONS  
 STATISTICAL ANALYSIS  
 .PROBABILITY DENSITY FUNCTIONS  
 .#WEIBULL DENSITY FUNCTIONS  
 EXPONENTIAL FUNCTIONS  
 FATIGUE TESTS  
 SAMPLING  
 RT WEIERSTRASS FUNCTIONS  
 1902  
 GS ANALYSIS (MATHEMATICS)  
 .REAL VARIABLES  
 .#WEIERSTRASS FUNCTIONS  
 RT ELLIPTIC FUNCTIONS  
 JACOBI INTEGRAL  
 % WEIGHT  
 2311 3408  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT ATOMIC WEIGHTS  
 BIOMASS  
 COEFFICIENTS  
 PAYLOADS  
 WEIGHT (MASS)  
 WEIGHT (MASS)  
 O101 O201 1309  
 UF WEIGHT FACTORS  
 GS #WEIGHT (MASS)  
 .ATOMIC WEIGHTS  
 .BIOMASS  
 .BODY WEIGHT  
 .ORGAN WEIGHT  
 .STRUCTURAL WEIGHT  
 RT CENTER OF MASS  
 % FORCE  
 GRAVITATION  
 LOADS (FORCES)  
 LOW MOLECULAR WEIGHTS  
 MASCONS  
 MASS  
 MOLECULAR WEIGHT  
 PAYLOADS  
 PRESSURE  
 VOLUME  
 % WEIGHT  
 WEIGHT ANALYSIS  
 O601 1309 2308 3203  
 RT % ANALYZING  
 NEW MOONS PROJECT  
 PREFLIGHT ANALYSIS  
 STRUCTURAL WEIGHT  
 SYSTEMS ANALYSIS  
 WEIGHT FACTORS  
 USE WEIGHT (MASS)  
 WEIGHT INDICATORS  
 1108 1110 1406 3203 3501  
 UF WIND TUNNEL BALANCES  
 GS MEASURING INSTRUMENTS  
 .INDICATING INSTRUMENTS  
 .#WEIGHT INDICATORS  
 ...MICROBALANCES  
 ...STRAIN GAGE BALANCES  
 ...THERMOBALANCES  
 RT BALANCE  
 MECHANICAL MEASUREMENT  
 PRESSURE GAGES  
 PRESSURE MEASUREMENT  
 % SCALE  
 STRAIN GAGES  
 TENSOMETERS  
 WEIGHT MEASUREMENT  
 1406 3501  
 UF MICROWEIGHING  
 RT DENSITY (MASS/VOLUME)  
 HYDROMETERS  
 % MEASUREMENT  
 WEIGHT REDUCTION  
 1406 3203 3501 4001  
 RT AIRCRAFT DESIGN  
 SPACECRAFT DESIGN  
 STRUCTURAL DESIGN  
 STRUCTURAL WEIGHT  
 SYSTEMS ANALYSIS  
 WEIGHTING FUNCTIONS  
 1902 1905  
 GS ANALYSIS (MATHEMATICS)  
 .REAL VARIABLES  
 ..MEASURE AND INTEGRATION  
 ...#WEIGHTING FUNCTIONS  
 FUNCTIONS (MATHEMATICS)  
 #WEIGHTING FUNCTIONS  
 RT STATISTICAL MECHANICS  
 WEIGHTLESS FLUIDS  
 1202 1309 2308



# NASA THESAURUS HIERARCHICAL UPDATE

## V/STOL AIRCRAFT

### WEST COMET

1901 3001  
GS CELESTIAL BODIES  
.COMETS  
.#WEST COMET  
RT SOLAR SYSTEM

### WEST FORD PROJECT

0707 0708 0709 3409  
GS PROGRAMS  
.PROJECTS  
.#WEST FORD PROJECT

### WEST GERMANY

1305  
UF FEDERAL REPUBLIC OF GERMANY  
GS NATIONS  
#WEST GERMANY  
RT ALPS MOUNTAINS (EUROPE)  
AZUR SATELLITE  
CENTRAL EUROPE  
EAST GERMANY  
EUROPE  
GERMAN INFRARED LABORATORY  
GERMAN SPACE PROGRAM  
GERMANY

### WEST INDIES

1305  
GS LANDFORMS  
.ISLANDS  
.#WEST INDIES  
...ANTIGUA AND BARBUDA  
...BAHAMAS  
...BARBADOS  
...CUBA  
...DOMINICA  
...GRENADA  
...GUADELOUPE  
...HAITI  
...JAMAICA  
...LESSER ANTILLES  
...MARTINIQUE  
...PUERTO RICO  
...TRINIDAD AND TOBAGO  
...VIRGIN ISLANDS  
RT ATLANTIC OCEAN  
CARIBBEAN REGION

### WEST VIRGINIA

1305  
GS NATIONS  
.UNITED STATES

RT .#WEST VIRGINIA  
ALLEGHENY PLATEAU (US)  
OHIO RIVER (US)  
POTOMAC RIVER VALLEY (MD-VA-WV)

### WESTAR SATELLITES

0702 0706 3107  
GS ARTIFICIAL SATELLITES  
.COMMUNICATION SATELLITES  
.#WESTAR SATELLITES  
RT POINT TO POINT COMMUNICATION  
TELECOMMUNICATION  
TELEGRAPH SYSTEMS

### WESTERN HEMISPHERE

0303  
RT EARTH (PLANET)  
EASTERN HEMISPHERE  
GEOGRAPHY

### WESTLAND AIRCRAFT

0201 0205 0206  
GS #WESTLAND AIRCRAFT  
.P-531 HELICOPTER  
.WESTLAND WHIRLWIND HELICOPTER  
RT % AIRCRAFT  
HELICOPTERS  
ROTARY WING AIRCRAFT  
V/STOL AIRCRAFT

### WESTLAND GROUND EFFECT MACHINES

0205  
UF SR-N2 GROUND EFFECT MACHINE  
SR-N3 GROUND EFFECT MACHINE  
SR-N5 GROUND EFFECT MACHINE  
WESTLAND SR-N2 GROUND EFFECT  
MACHINE  
WESTLAND SR-N2 HOVERCRAFT  
WESTLAND SR-N3 GROUND EFFECT  
MACHINE  
WESTLAND SR-N3 HOVERCRAFT  
WESTLAND SR-N5 GROUND EFFECT  
MACHINE  
GS GROUND EFFECT MACHINES  
#WESTLAND GROUND EFFECT MACHINES  
RT % AIRCRAFT

### WESTLAND MK-10 HELICOPTER

USE WESTLAND WHIRLWIND HELICOPTER

### WESTLAND P-531 HELICOPTER

USE P-531 HELICOPTER

### WESTLAND SR-N2 GROUND EFFECT MACHINE

USE WESTLAND GROUND EFFECT MACHINES

WESTLAND SR-N2 HOVERCRAFT  
USE WESTLAND GROUND EFFECT MACHINES

WESTLAND SR-N3 GROUND EFFECT MACHINE  
USE WESTLAND GROUND EFFECT MACHINES

WESTLAND SR-N3 HOVERCRAFT  
USE WESTLAND GROUND EFFECT MACHINES

WESTLAND SR-N5 GROUND EFFECT MACHINE  
USE WESTLAND GROUND EFFECT MACHINES

### WESTLAND WHIRLWIND HELICOPTER

0206  
UF WESTLAND MK-10 HELICOPTER  
WHIRLWIND MK-10 HELICOPTER  
GS UTILITY AIRCRAFT  
#WESTLAND WHIRLWIND HELICOPTER  
V/STOL AIRCRAFT  
.ROTARY WING AIRCRAFT  
..HELICOPTERS  
...MILITARY HELICOPTERS  
...#WESTLAND WHIRLWIND HELICOPTER  
WESTLAND AIRCRAFT  
#WESTLAND WHIRLWIND HELICOPTER  
RT % AIRCRAFT

### WET CELLS

0302 0604 0904  
GS ELECTROCHEMICAL CELLS  
.ELECTRIC BATTERIES  
.#WET CELLS  
RT % ELECTRIC CELLS  
ELECTROLYTES  
FUEL CELLS  
NONAQUEOUS ELECTROLYTES  
PRIMARY BATTERIES

### WET SPINNING

1809  
RT EXTRUDING  
FIBERS  
% FILAMENTS  
% PROCESSING  
SYNTHETIC FIBERS  
TEXTILES  
WETTING

### WETLANDS

1305 1306 1308 1310  
GS LAND  
#WETLANDS  
RT COASTAL CURRENTS  
COASTAL ECOLOGY

COASTAL PLAINS  
COASTAL WATER  
ENVIRONMENT EFFECTS  
FISHERIES  
MARINE BIOLOGY  
MARINE ENVIRONMENTS  
MARINE RESOURCES  
MARSHLANDS  
NEARSHORE WATER  
OCEANOGRAPHY  
OIL POLLUTION  
SEA GRASSES  
SHORELINES  
TIDES  
WATER RESOURCES  
WATERFOWL  
WILDLIFE

WETNESS  
USE MOISTURE CONTENT

WETTABILITY  
O603 1202 3408  
RT

ADHESION  
ADHESION TESTS  
FORMATIONS  
HYGROSCOPICITY  
PERMEABILITY  
POROSITY  
SURFACE PROPERTIES  
WETTING

WETTING  
O602 1202 3407  
RT

COOLING  
DIPPING  
FOAMING  
INTERFACIAL TENSION  
SATURATION  
% SATURATION  
% SOAKING  
SOAPS  
SPRAYING  
SPRINKLING  
SUBMERGING  
WET SPINNING  
WETTABILITY

WHALES  
O402  
GS  
ANIMALS  
. VERTEBRATES  
... MAMMALS  
... MARINE MAMMALS  
... #WHALES

WHARVES  
1103 1502 3401 3404  
UF  
RT

PIERS  
CARGO SHIPS  
DAMS  
EARTH RESOURCES  
FREIGHTERS  
HARBORS  
MARINE TECHNOLOGY  
MATERIALS HANDLING  
% PORTS  
RIVERS  
SHIP TERMINALS  
TANKER SHIPS  
TERMINAL FACILITIES  
WATER

WHEAT  
O409 0505  
GS

FARM CROPS  
. GRAINS (FOOD)  
. #WHEAT  
RT CROP GROWTH  
CROP VIGOR  
% CROPS  
RICE

WHEATSTONE BRIDGES  
O902 0905 1406  
GS

CIRCUITS  
. ELECTRIC BRIDGES  
. #WIRE BRIDGE CIRCUITS  
. #WHEATSTONE BRIDGES  
RT MEASURING INSTRUMENTS  
OHMMETERS

WHEEL BRAKES  
O203 0208 2202  
GS

BRAKES (FOR ARRESTING MOTION)  
#WHEEL BRAKES  
RT AIRCRAFT BRAKES  
AIRCRAFT SAFETY  
ANTISKID DEVICES  
CONTROLLABILITY  
FRICTION  
HYDRAULIC EQUIPMENT  
LANDING GEAR  
TIRES  
VEHICLE WHEELS

WHEELCHAIRS  
1502  
RT  
DISABILITIES  
HUMAN FACTORS ENGINEERING  
LOCOMOTION

RAMPS (STRUCTURES)

WHEELS  
1504  
GS  
#WHEELS  
. COUNTER-ROTATING WHEELS  
. FLYWHEELS  
. REACTION WHEELS  
. TOROIDAL WHEELS  
. TURBINE WHEELS  
. VEHICLE WHEELS  
. NOSE WHEELS  
. WATER WHEELS

RT  
BEARINGS  
BRAKES (FOR ARRESTING MOTION)  
GEARS  
HUBS  
LANDING GEAR  
PULLEYS  
ROLLERS  
ROTORS  
SHAFTS (MACHINE ELEMENTS)  
SPOKES  
TIRES

WHIP ANTENNAS  
O701 0901  
GS  
ANTENNAS  
. OMNIDIRECTIONAL ANTENNAS  
. MONOPOLE ANTENNAS  
. #WHIP ANTENNAS  
RT RADIO ANTENNAS

WHIPLASH INJURIES  
O405 0408  
GS  
INJURIES  
#WHIPLASH INJURIES  
RT BACK INJURIES  
CRASH INJURIES

WHIRL  
USE

WHIRL INSTABILITY  
USE ROTARY STABILITY

WHIRL TOWERS  
1108  
RT  
HELICOPTER DESIGN  
HOVERING  
HOVERING STABILITY  
PARACHUTES  
ROTARY WINGS  
ROTOR AERODYNAMICS  
SPIN TESTS

# NASA THESAURUS HIERARCHICAL UPDATE

WHIRLING  
 USE ROTATION  
 WHIRLING TESTS  
 USE SPIN TESTS  
 WHIRLWIND MK-10 HELICOPTER  
 USE WESTLAND WHIRLWIND HELICOPTER  
 WHISKER COMPOSITES  
 1704  
 UF METAL WHISKER REINFORCEMENT  
 GS COMPOSITE MATERIALS  
 #WHISKER COMPOSITES  
 RT ARAMID FIBER COMPOSITES  
 EUTECTIC ALLOYS  
 METAL MATRIX COMPOSITES  
 REINFORCING FIBERS  
 WHISKERS (CRYSTALS)  
 0906 1701 1704 2601 2602  
 GS CRYSTALS  
 #WHISKERS (CRYSTALS)  
 RT DENDRITIC CRYSTALS  
 FIBERS  
 % FILAMENTS  
 WHISPERING GALLERY MODES  
 0710  
 GS MODES  
 .PROPAGATION MODES  
 .#WHISPERING GALLERY MODES  
 RT ACOUSTIC FREQUENCIES  
 ACOUSTIC PROPAGATION  
 ELECTROMAGNETIC RADIATION  
 ELECTROMAGNETIC WAVE TRANSMISSION  
 WAVE PROPAGATION  
 WAVELENGTHS  
 WHISTLER RECORDERS  
 0710 1302 2304 2402  
 GS COMMUNICATION EQUIPMENT  
 .RADIO RECEIVERS  
 .#WHISTLER RECORDERS  
 RADIO EQUIPMENT  
 .RADIO RECEIVERS  
 .#WHISTLER RECORDERS  
 RECEIVERS  
 .RADIO RECEIVERS  
 .#WHISTLER RECORDERS  
 RECORDING INSTRUMENTS  
 #WHISTLER RECORDERS  
 RT SONOGRAMS

WHISTLERS  
 0710 1302 2304 2402 3009  
 GS ATMOSPHERIC RADIATION  
 .IONOSPHERIC NOISE  
 .#WHISTLERS  
 ELECTROMAGNETIC INTERFERENCE  
 .RADIO FREQUENCY INTERFERENCE  
 .ELECTROMAGNETIC NOISE  
 ...ATMOSPHERICS  
 ...#WHISTLERS  
 ...IONOSPHERIC NOISE  
 ...#WHISTLERS  
 ELECTROMAGNETIC RADIATION  
 .RADIO WAVES  
 ..SKY WAVES  
 ..#WHISTLERS  
 DAWN CHORUS  
 RT ELECTROMAGNETIC FIELDS  
 LIGHTNING  
 MICROWAVES  
 RADIO SIGNALS  
 SONOGRAMS  
 WHITE BLOOD CELLS  
 USE LEUKOCYTES  
 WHITE DWARF STARS  
 3001 3009  
 GS CELESTIAL BODIES  
 .STARS  
 ..EARLY STARS  
 ...HOT STARS  
 ...#WHITE DWARF STARS  
 RT CATAclysmic VARIABLES  
 DEGENERATE MATTER  
 DWARF NOVAE  
 DWARF STARS  
 RED DWARF STARS  
 SUBDWARF STARS  
 SUPERNOVA REMNANTS  
 WOLF-RAYET STARS  
 WHITE HOLES (ASTRONOMY)  
 1901 3001 3002 3003 3009  
 GS CELESTIAL BODIES  
 .STARS  
 .#WHITE HOLES (ASTRONOMY)  
 RT BLACK HOLES (ASTRONOMY)  
 COSMOLOGY  
 ELECTROMAGNETIC RADIATION  
 EVENT HORIZON  
 GRAVITATIONAL COLLAPSE  
 GRAVITATIONAL LENSES  
 LIGHT EMISSION  
 NAKED SINGULARITIES

SUPERNOVA REMNANTS  
 WHITE LIGHT HOLOGRAPHY  
 1407 2306 2310  
 GS IMAGERY  
 .HOLOGRAPHY  
 .#WHITE LIGHT HOLOGRAPHY  
 PHOTOGRAPHY  
 .HOLOGRAPHY  
 .#WHITE LIGHT HOLOGRAPHY  
 RT DATA STORAGE  
 WAVE FRONT RECONSTRUCTION  
 WHITE NOISE  
 1411 2301 2306 2402  
 UF SPECTRAL NOISE  
 GS ELECTROMAGNETIC INTERFERENCE  
 .RADIO FREQUENCY INTERFERENCE  
 ..ELECTROMAGNETIC NOISE  
 ..#WHITE NOISE  
 ....THERMAL NOISE  
 RT ELECTROMAGNETIC NOISE MEASUREMENT  
 JAMMING  
 % NOISE  
 NOISE (SOUND)  
 NOISE SPECTRA  
 RANDOM NOISE  
 SIGNAL TO NOISE RATIOS  
 SPECTRAL BANDS  
 WHITEOUT  
 0506 0605 2003 2310  
 RT VISIBILITY  
 VISUAL FLIGHT  
 WHITHAM RULE  
 0710 3201 3203 3302  
 GS RULES  
 #WHITHAM RULE  
 RT SHOCK WAVES  
 WAVE PROPAGATION  
 WHITTAKER FUNCTIONS  
 1902  
 GS ANALYSIS (MATHEMATICS)  
 .REAL VARIABLES  
 .#WHITTAKER FUNCTIONS  
 FUNCTIONS (MATHEMATICS)  
 #WHITTAKER FUNCTIONS  
 RT DIFFERENTIAL EQUATIONS  
 WICKS  
 1504  
 RT FUSES (ORDNANCE)

WIDE ANGLE LENSES  
1407 1412 2306 2310  
GS LENSES  
#WIDE ANGLE LENSES  
OPTICAL EQUIPMENT  
#WIDE ANGLE LENSES  
RT ALL SKY PHOTOGRAPHY  
CAMERAS  
PANORAMIC CAMERAS  
WIDEBAND  
USE BROADBAND  
WIDEBAND COMMUNICATION  
0702 0710  
GS TELECOMMUNICATION  
#WIDEBAND COMMUNICATION  
RT BROADBAND AMPLIFIERS  
CODE DIVISION MULTIPLE ACCESS  
MULTIPLE ACCESS  
POINT TO POINT COMMUNICATION  
TIME DIVISION MULTIPLE ACCESS  
TROPOSPHERIC SCATTERING  
WIDMANSTATTEN STRUCTURE  
1701 1704 2601 3009  
GS CRYSTAL STRUCTURE  
#WIDMANSTATTEN STRUCTURE  
MICROSTRUCTURE  
#WIDMANSTATTEN STRUCTURE  
RT IRON METEORITES  
METALLOGRAPHY  
METEORITIC MICROSTRUCTURES  
% PATTERNS  
WIDTH  
3408  
GS DIMENSIONS  
#WIDTH  
RT BANDWIDTH  
% SPAN  
WIENER FILTERING  
0705 0710 1905 2402  
RT ELECTRIC FILTERS  
OPTIMIZATION  
STATISTICAL ANALYSIS  
WIENER HOPF EQUATIONS  
0703 1202 1905 2402  
GS ANALYSIS (MATHEMATICS)  
.FUNCTIONAL ANALYSIS  
..INTEGRAL EQUATIONS  
..#WIENER HOPF EQUATIONS  
RT % EQUATIONS

WIGGLER MAGNETS  
0801  
GS MAGNETS  
#WIGGLER MAGNETS  
REFLECTORS  
#WIGGLER MAGNETS  
RT DIFFRACTION RADIATION  
FREE ELECTRON LASERS  
LASER PUMPING  
TUNABLE LASERS  
WIGHTMAN THEORY  
USE FIELD THEORY (PHYSICS)  
QUANTUM THEORY  
RELATIVISTIC THEORY  
WIGNER COEFFICIENT  
1902 2401 2403  
GS COEFFICIENTS  
#WIGNER COEFFICIENT  
RT ANGULAR MOMENTUM  
% MECHANICS (PHYSICS)  
WILDERNESS  
1308  
RT DESERTS  
FORESTS  
LAND MANAGEMENT  
PLAINS  
REMOTE REGIONS  
RURAL AREAS  
WILDLIFE  
0402  
GS ANIMALS  
#WILDLIFE  
RT BIRDS  
ENDANGERED SPECIES  
ENVIRONMENT EFFECTS  
FISHES  
HABITATS  
WETLANDS  
WILDLIFE RADIOLOCATION  
0501 0701 0702 0705 0707  
GS TRACKING (POSITION)  
.RADIO TRACKING  
..#WILDLIFE RADIOLOCATION  
RT ANIMALS  
BIOINSTRUMENTATION  
BIOTELEMETRY  
RADIO TRANSMITTERS  
REMOTE SENSORS  
SATELLITE INSTRUMENTS

WILLISTON BASIN (NORTH AMERICA)  
1305 1306  
GS LANDFORMS  
.STRUCTURAL BASINS  
..#WILLISTON BASIN (NORTH AMERICA)  
RT CANADA  
MONTANA  
NORTH AMERICA  
NORTH DAKOTA  
WINCHES  
1504  
RT CRANES  
ELEVATORS (LIFTS)  
% LIFTS  
PULLEYS  
WIND (METEOROLOGY)  
0101 0201 1110 1203 1308 2003 3501  
GS #WIND (METEOROLOGY)  
.CIRCUMPOLAR WESTERLIES  
.GROUND WIND  
.GUSTS  
.MONSOONS  
.SEA BREEZE  
.SQUALLS  
.WINDS ALOFT  
..GEOSTROPHIC WIND  
..JET STREAMS (METEOROLOGY)  
AEOLIAN TONES  
AEROLGY  
AEROCURRENTS  
AIR POLLUTION  
ALPINE METEOROLOGY  
ANEMOMETERS  
ATMOSPHERIC CIRCULATION  
BAROTROPIC FLOW  
% BARRIERS  
BLOWING  
CLIMATOLOGY  
CYCLONES  
GRAVITY WAVES  
HOT-FILM ANEMOMETERS  
JIMSPHERE BALLOONS  
MARINE METEOROLOGY  
MERIDIONAL FLOW  
MESOSCALE PHENOMENA  
METEOROLOGY  
MIXING HEIGHT  
PRESSURE ICE  
RIPPLES  
STORM DAMAGE

[illegible]





## NASA THESAURUS HIERARCHICAL UPDATE

[illegible]

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.AERODYNAMIC BRAKES
.#WING FLAPS
...LEADING EDGE FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
...VORTEX FLAPS
.AIRCRAFT BRAKES
.#WING FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
CONTROL SURFACES
.FLAPS (CONTROL SURFACES)
.#WING FLAPS
...LEADING EDGE FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
...VORTEX FLAPS
DRAG DEVICES
.AERODYNAMIC BRAKES
.#WING FLAPS
...LEADING EDGE FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
...VORTEX FLAPS
JET FLAPS
EXTERNALLY BLOWN FLAPS
JET FLAPS
SPLIT FLAPS

WING FLOW METHOD TESTS
O101 O102 O104 1108 1202 1203
RT FLIGHT TESTS
FLUID FLOW
GROUND TESTS
% METHODOLOGY
% TESTS
TRANSONIC WIND TUNNELS

WING ICING
USE AIRCRAFT ICING

WING LOADING
O101 O102 O104 3203
GS AERODYNAMIC FORCES
#WING LOADING
LOADS (FORCES)
.DYNAMIC LOADS
.#WING LOADING
AERODYNAMIC LOADS
AEROELASTICITY
EDGE LOADING
FORCE DISTRIBUTION
GUST LOADS
LEADING EDGE THRUST
STATIC LOADS
SWEEP EFFECT

VORTEX FLAPS
WING NACELLE CONFIGURATIONS
O102
GS AERODYNAMIC CONFIGURATIONS
#WING NACELLE CONFIGURATIONS
RT % AIRCRAFT
AIRFRAMES
EXTERNALLY BLOWN FLAPS
WING OSCILLATIONS
O101 O104
GS OSCILLATIONS
.AIRFOIL OSCILLATIONS
.#WING OSCILLATIONS
RT AERODYNAMIC STABILITY
AEROELASTIC RESEARCH WINGS
FLAPPING
FLUTTER
STABLE OSCILLATIONS
UNDAMPED OSCILLATIONS
UNSTEADY AERODYNAMICS
VIBRATION

WING PANELS
O102 O103 O104 O202
GS PANELS
#WING PANELS
STRUCTURAL MEMBERS
#WING PANELS
CURVED PANELS
RECTANGULAR PANELS
WINGS

WING PLANFORMS
O102 O104 O202
GS PLANFORMS
#WING PLANFORMS
..CHANNEL WINGS
..INFINITE SPAN WINGS
..SWEEP FORWARD WINGS
...TRAPEZOIDAL WINGS
...SWEEPBACK WINGS
...ARROW WINGS
...DELTA WINGS
...TRAPEZOIDAL WINGS
..VARIABLE SWEEP WINGS
HP-115 AIRCRAFT
LOW ASPECT RATIO WINGS
MONOPLANES
OBLIQUE WINGS
RECTANGULAR PLANFORMS
SLENDER WINGS
SWEEP WINGS
SWING WINGS

AERODYNAMIC BRKES
.#WING FLAPS
...LEADING EDGE FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
...VORTEX FLAPS
.AIRCRAFT BRAKES
.#WING FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
CONTROL SURFACES
.FLAPS (CONTROL SURFACES)
.#WING FLAPS
...LEADING EDGE FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
...VORTEX FLAPS
DRAG DEVICES
.AERODYNAMIC BRAKES
.#WING FLAPS
...LEADING EDGE FLAPS
...LEADING EDGE SLATS
...TRAILING EDGE FLAPS
...VORTEX FLAPS
JET FLAPS
EXTERNALLY BLOWN FLAPS
JET FLAPS
SPLIT FLAPS

WING FLOW METHOD TESTS
O101 O102 O104 1108 1202 1203
RT FLIGHT TESTS
FLUID FLOW
GROUND TESTS
% METHODOLOGY
% TESTS
TRANSONIC WIND TUNNELS

WING ICING
USE AIRCRAFT ICING

WING LOADING
O101 O102 O104 3203
GS AERODYNAMIC FORCES
#WING LOADING
LOADS (FORCES)
.DYNAMIC LOADS
.#WING LOADING
AERODYNAMIC LOADS
AEROELASTICITY
EDGE LOADING
FORCE DISTRIBUTION
GUST LOADS
LEADING EDGE THRUST
STATIC LOADS
SWEEP EFFECT

VORTEX FLAPS
WING NACELLE CONFIGURATIONS
O102
GS AERODYNAMIC CONFIGURATIONS
#WING NACELLE CONFIGURATIONS
RT % AIRCRAFT
AIRFRAMES
EXTERNALLY BLOWN FLAPS
WING OSCILLATIONS
O101 O104
GS OSCILLATIONS
.AIRFOIL OSCILLATIONS
.#WING OSCILLATIONS
RT AERODYNAMIC STABILITY
AEROELASTIC RESEARCH WINGS
FLAPPING
FLUTTER
STABLE OSCILLATIONS
UNDAMPED OSCILLATIONS
UNSTEADY AERODYNAMICS
VIBRATION

WING PANELS
O102 O103 O104 O202
GS PANELS
#WING PANELS
STRUCTURAL MEMBERS
#WING PANELS
CURVED PANELS
RECTANGULAR PANELS
WINGS

WING PLANFORMS
O102 O104 O202
GS PLANFORMS
#WING PLANFORMS
..CHANNEL WINGS
..INFINITE SPAN WINGS
..SWEEP FORWARD WINGS
...TRAPEZOIDAL WINGS
...SWEEPBACK WINGS
...ARROW WINGS
...DELTA WINGS
...TRAPEZOIDAL WINGS
..VARIABLE SWEEP WINGS
HP-115 AIRCRAFT
LOW ASPECT RATIO WINGS
MONOPLANES
OBLIQUE WINGS
RECTANGULAR PLANFORMS
SLENDER WINGS
SWEEP WINGS
SWING WINGS

THRUST DISTRIBUTION
UNSWEPT WINGS
WING PROFILES
O101 O102 O104 O201 1203 3501
GS AIRFOIL PROFILES
#WING PROFILES
..WING SPAN
RT AERODYNAMIC INTERFERENCE
GAW-1 AIRFOIL
GAW-2 AIRFOIL
MISSION ADAPTIVE WINGS
MONOPLANES
SUPERCRITICAL WINGS
SWING WINGS
WINGS

WING ROOTS
O102 O103 O104
RT AERODYNAMIC CONFIGURATIONS
AIRCRAFT CONFIGURATIONS
DROOPED AIRFOILS
FAIRINGS
% ROOTS

WING SLATS
USE LEADING EDGE SLATS

WING SLOTS
O102 O103 O104
GS SLOTS
#WING SLOTS
RT BOUNDARY LAYER CONTROL
LEADING EDGE SLATS
VORTEX GENERATORS

WING SPAN
O101 O102 O104 O201
GS AIRFOIL PROFILES
.WING PROFILES
.#WING SPAN
RT % SPAN
SPANWISE BLOWING
WINGS

WING TANKS
O102 O104 O202 2701
GS TANKS (CONTAINERS)
.FUEL TANKS
.#WING TANKS
RT % CONTAINERS
EXTERNAL STORE SEPARATION
EXTERNAL STORES
EXTERNAL TANKS
JETTISON SYSTEMS

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# NASA THESAURUS HIERARCHICAL UPDATE

## WING-FUSELAGE STORES

WING TIP VORTICES  
 O101 1201 2311 3501  
 GS VORTICES  
 #WING TIP VORTICES  
 RT BLADE-VORTEX INTERACTION  
 FLOW DISTORTION  
 HORSESHOE VORTICES  
 ROTATING FLUIDS

## WING TIPS

O102 0103 0104  
 GS TIPS  
 #WING TIPS  
 RT AIRFOIL PROFILES  
 BLADE TIPS  
 JOINED WINGS  
 WINGS

## WING-FUSELAGE STORES

O101 0102 0103  
 RT EXTERNAL STORE SEPARATION  
 EXTERNAL STORES  
 FUSELAGES  
 NACELLES  
 PODS (EXTERNAL STORES)  
 PROTUBERANCES  
 % STORAGE TANKS  
 STORAGE TANKS  
 TANKS (CONTAINERS)  
 WEAPONS  
 WING TANKS

## % WINGED VEHICLES

O102 0104 0201  
 SN (USE OF A MORE SPECIFIC TERM IS  
 RECOMMENDED--CONSULT THE TERMS  
 LISTED BELOW)  
 RT % AIRCRAFT

B-1 AIRCRAFT  
 DRONE VEHICLES  
 FIREBEE 2 TARGET DRONE AIRCRAFT  
 GLIDERS  
 HANG GLIDERS  
 HYPERSONIC VEHICLES  
 JET AIRCRAFT  
 KA-6 SAILPLANES  
 LAUNCH VEHICLES  
 LEADING EDGE FLAPS  
 MAN POWERED AIRCRAFT  
 MISSILES  
 MONOPLANES  
 RECOVERABLE LAUNCH VEHICLES  
 RECOVERABLE SPACECRAFT

REENTRY VEHICLES  
 RESEARCH AIRCRAFT  
 ROCKET VEHICLES  
 SHORT TAKEOFF AIRCRAFT  
 SUPERCRITICAL WINGS  
 ULTRALIGHT AIRCRAFT  
 % VEHICLES  
 VERTICAL TAKEOFF AIRCRAFT  
 WINGS

## WINGLETS

O204  
 RT DRAG REDUCTION  
 FINS  
 PROTUBERANCES  
 VORTEX ALLEVIATION  
 VORTEX AVOIDANCE  
 WINGS

## WINGS

O104  
 UF  
 GS  
 CANTILEVER WINGS  
 AIRFOILS  
 #WINGS  
 ..AEROELASTIC RESEARCH WINGS  
 ..CAMBERED WINGS  
 ..CARET WINGS  
 ..CHANNEL WINGS  
 ..CRUCIFORM WINGS  
 ..FIXED WINGS  
 ..FLEXIBLE WINGS  
 ..PARAMINGS  
 ..GAW-1 AIRFOIL  
 ..GAW-2 AIRFOIL  
 ..JOINED WINGS  
 ..LOW ASPECT RATIO WINGS  
 ...DELTA WINGS  
 ...TRAPEZOIDAL WINGS  
 ...MISSION ADAPTIVE WINGS  
 ...OBLIQUE WINGS  
 ...RIGID WINGS  
 ...ROTARY WINGS  
 ...CIRCULATION CONTROL ROTORS  
 ...LIFTING ROTORS  
 ...BEARINGLESS ROTORS  
 ...RIGID ROTORS  
 ...TILTING ROTORS  
 ...TIP DRIVEN ROTORS  
 ...X WING ROTORS  
 ...SLENDER WINGS  
 ...INFINITE SPAN WINGS  
 ...SUPERCRITICAL WINGS  
 ...SWEPT WINGS  
 ...SWEPT FORWARD WINGS  
 ....TRAPEZOIDAL WINGS

...SWEPTBACK WINGS  
 ....ARROW WINGS  
 ....DELTA WINGS  
 ....TRAPEZOIDAL WINGS  
 ...SWING WINGS  
 ..THIN WINGS  
 ...INFINITE SPAN WINGS  
 ...TWISTED WINGS  
 ...UNCAMBERED WINGS  
 ...RING WINGS  
 ...UNSWEEP WINGS  
 ...INFINITE SPAN WINGS  
 ...RECTANGULAR WINGS  
 ...RING WINGS

RT

..VARIABLE SWEEP WINGS  
 AIRCRAFT CONSTRUCTION MATERIALS  
 AIRCRAFT PARTS  
 AIRCRAFT STRUCTURES  
 AIRFOIL FENCES  
 AIRFRAMES  
 ASPECT RATIO  
 BLUNT TRAILING EDGES  
 BODY-WING AND TAIL CONFIGURATIONS  
 BODY-WING CONFIGURATIONS  
 COATINGS  
 CONTROL SURFACES  
 DROOPED AIRFOILS  
 DUAL WING CONFIGURATIONS  
 LEADING EDGE FLAPS  
 MISSILE COMPONENTS  
 POROUS BOUNDARY LAYER CONTROL  
 ROTORS  
 SPOILERS  
 WING PANELS  
 WING PROFILES  
 WING SPAN  
 WING TIPS  
 % WINGED VEHICLES  
 WINGLETS

WINTER

2001  
 GS SEASONS  
 #WINTER  
 RT AUTUMN  
 COLD WEATHER  
 EQUINOXES  
 PRESSURE ICE  
 SOLSTICES  
 SPRING (SEASON)  
 SUMMER

WIRE

O701 0902 0904 0905 1504 1704  
 GS #WIRE

.ELECTRIC WIRE  
 .EXPLODING WIRES  
 .GUY WIRES  
 RT BILLETTS  
 CABLES (ROPES)  
 % COILS  
 CORDAGE  
 FASTENERS  
 % FILAMENTS  
 FLAT CONDUCTORS  
 JUMPERS  
 REINFORCEMENT (STRUCTURES)  
 RODS  
 WIRING  
 WIRE BRIDGE CIRCUITS  
 O902 0905 1001  
 GS CIRCUITS  
 .ELECTRIC BRIDGES  
 .#WIRE BRIDGE CIRCUITS  
 ...WHEATSTONE BRIDGES  
 RT ELECTRIC WIRE  
 EXPLODING WIRES  
 WIRE CLOTH  
 O903 1704 3203  
 UF WIRE MESH  
 RT FABRICS  
 REINFORCEMENT (STRUCTURES)  
 % SCREENS  
 SIEVES  
 WIRE GRID LENSES  
 1407 1412 2310  
 GS LENSES  
 #WIRE GRID LENSES  
 RETICLES  
 #WIRE GRID LENSES  
 RT % GRIDS  
 LENS ANTENNAS  
 MAGNETIC LENSES  
 TURNSTILE ANTENNAS  
 WIRE MESH  
 USE WIRE CLOTH  
 WIRE WINDING  
 1002 1507 1704  
 GS WINDING  
 #WIRE WINDING  
 RT MAGNET COILS  
 WIRING  
 WIRELESS COMMUNICATION  
 O702 0705 0709  
 CARRIER SYSTEMS  
 TELECOMMUNICATION  
 #WIRELESS COMMUNICATION  
 AIRCRAFT COMMUNICATION  
 CLOSED CIRCUIT TELEVISION  
 COMMUNICATION SATELLITES  
 DATA LINKS  
 DATA TRANSMISSION  
 DIGITAL SPACECRAFT TELEVISION  
 FACSIMILE COMMUNICATION  
 OPTICAL COMMUNICATION  
 RADIO TELEMETRY  
 SIGNAL TRANSMISSION  
 SPACE COMMUNICATION  
 SPACECRAFT COMMUNICATION  
 TELEMETRY  
 VOICE COMMUNICATION  
 UF CARRIER SYSTEMS  
 GS TELECOMMUNICATION  
 RT #WIRELESS COMMUNICATION  
 AIRCRAFT COMMUNICATION  
 CLOSED CIRCUIT TELEVISION  
 COMMUNICATION SATELLITES  
 DATA LINKS  
 DATA TRANSMISSION  
 DIGITAL SPACECRAFT TELEVISION  
 FACSIMILE COMMUNICATION  
 OPTICAL COMMUNICATION  
 RADIO TELEMETRY  
 SIGNAL TRANSMISSION  
 SPACE COMMUNICATION  
 SPACECRAFT COMMUNICATION  
 TELEMETRY  
 VOICE COMMUNICATION  
 WIRING  
 O902 1001 2304  
 SN (PROCESS--AS DISTINGUISHED FROM MATERIAL)  
 UF ELECTRIC WIRING  
 WIRING SYSTEMS  
 RT BUNDLES  
 CIRCUITS  
 ELECTRICAL INSULATION  
 FLAT CONDUCTORS  
 SPLICING  
 TRANSMISSION LINES  
 WIRE WINDING  
 WIRING SYSTEMS  
 USE WIRING  
 WISCONSIN  
 1305  
 GS NATIONS  
 .UNITED STATES  
 .#WISCONSIN  
 WISWESSER NOTATIONS  
 O601 0603  
 GS CLASSIFICATIONS  
 .INDEXES (DOCUMENTATION)  
 .#WISWESSER NOTATIONS  
 CODING  
 #WISWESSER NOTATIONS  
 RT % CHEMICAL COMPOUNDS  
 % CHEMISTRY  
 IDENTIFYING  
 MOLECULAR STRUCTURE  
 % REFERENCE SYSTEMS  
 KWB APPROXIMATION  
 USE WENTZEL-KRAMER-BRILLOUIN METHOD  
 WOLF-RAYET STARS  
 3001  
 UF W STARS  
 W-R STARS  
 CELESTIAL BODIES  
 .STARS  
 ..EARLY STARS  
 ...HOT STARS  
 ...#WOLF-RAYET STARS  
 RT A STARS  
 ASTROPHYSICS  
 B STARS  
 CARBON STARS  
 CELESTIAL MECHANICS  
 EJECTA  
 HELIUM  
 NITROGEN  
 O STARS  
 STELLAR ENVELOPES  
 STELLAR LUMINOSITY  
 STELLAR MASS EJECTION  
 WHITE DWARF STARS  
 WOLFRAM  
 USE TUNGSTEN  
 WOLVES  
 O402  
 GS ANIMALS  
 .VERTEBRATES  
 ..MAMMALS  
 ...#WOLVES  
 WOMEN  
 USE FEMALES  
 WOOD  
 O409 1805  
 GS #WOOD  
 .CORK (MATERIALS)  
 .PLYWOOD  
 BALSA  
 CELLULOSE  
 MASONITE (TRADEMARK)  
 ORGANIC MATERIALS  
 PAPER (MATERIAL)  
 PLANTS (BOTANY)  
 SLIVERS  
 TREES (PLANTS)  
 WOODEN STRUCTURES  
 WOODEN STRUCTURES

# NASA THESAURUS HIERARCHICAL UPDATE

O101 0102 3203  
RT PLYWOOD  
% STRUCTURES  
WOOD

WOOL  
O402 0508 1811  
SN (LIMITED TO ANIMAL FIBERS)  
GS  
#WOOL  
FABRICS  
FIBERS  
#WOOL  
FELTS  
HAIR  
KERATINS  
ORGANIC MATERIALS  
SHEEP  
YARNS

WORD PROCESSING  
O708 4001  
RT COMPUTER TECHNIQUES  
DATA PROCESSING  
OFFICE AUTOMATION  
WORDS (LANGUAGE)

WORDS (LANGUAGE)  
O702 0703 3405  
GS COMMUNICATION THEORY  
#WORDS (LANGUAGE)  
..SYLLABLES  
LANGUAGES  
.SENTENCES  
.#WORDS (LANGUAGE)  
...SYLLABLES  
LINGUISTICS  
.SYNTAX  
..SENTENCES  
...#WORDS (LANGUAGE)  
....SYLLABLES  
SPEECH  
.TALKING  
.#WORDS (LANGUAGE)  
...SYLLABLES  
CONSONANTS (SPEECH)  
CONVERSATION  
ENGLISH LANGUAGE  
GRAMMARS  
MESSAGES  
ORTHOGRAPHY  
PHONEMES  
PHONEMICS  
PHONETICS  
SEMANTICS  
TERMINOLOGY

THESAURI  
VERBAL COMMUNICATION  
VOICE COMMUNICATION  
VOWELS  
WORD PROCESSING

WORK  
2308 2311 3406  
GS #WORK  
.PHYSICAL WORK  
RT % ENERGY  
HEAT  
HORSEPOWER  
KINETIC ENERGY  
OCCUPATION  
PHYSICAL FACTORS

WORK CAPACITY  
1504 2308  
RT HYPERKINESIA  
ORBITAL WORKERS  
PHYSICAL FITNESS  
PHYSICAL WORK  
WORKLOADS (PSYCHOPHYSIOLOGY)

WORK FUNCTIONS  
1902 2402 2403 2603 3304  
UF SCHOTTKY EFFECT  
RT ELECTRON EMISSION  
% FUNCTIONS  
IONIZATION POTENTIALS  
PERVEANCE  
PHOTOELECTRIC EMISSION  
SCHOTTKY DIODES  
THERMIONIC EMISSION

WORK HARDENING  
2601 2603 3203  
GS HARDENING (MATERIALS)  
#WORK HARDENING  
..STRAIN HARDENING  
COLD HARDENING  
MECHANICAL TWINNING  
METAL WORKING  
PEENING  
SHOT PEENING  
WORK SOFTENING

WORK SOFTENING  
1202  
GS SOFTENING  
#WORK SOFTENING  
RT MICROSTRUCTURE  
PLASTIC DEFORMATION  
WORK HARDENING

WORK-REST CYCLE  
1504 3203  
GS CYCLES  
#WORK-REST CYCLE  
RT FATIGUE (BIOLOGY)  
RELAXATION (PHYSIOLOGY)

WORKHORSE HELICOPTER  
USE CH-21 HELICOPTER

WORKING FLUIDS  
O303 1202 1203 1504 2501  
RT CONSUMABLES (SPACECRAFT)  
FERROFLUIDS  
FLUID POWER  
FLUID TRANSMISSION LINES  
% FLUIDS  
HIGH TEMPERATURE FLUIDS  
HYDRAULIC FLUIDS  
JET CONDENSERS  
PHASE CHANGE MATERIALS  
SULFUR HEXAFLUORIDE  
TRANSMISSION FLUIDS

WORKLOADS (PSYCHOPHYSIOLOGY)  
O408 0410 0502  
RT FATIGUE (BIOLOGY)  
HUMAN PERFORMANCE  
MENTAL PERFORMANCE  
PHYSICAL WORK  
PSYCHOMOTOR PERFORMANCE  
PSYCHOPHYSIOLOGY  
STRESS (PSYCHOLOGY)  
WORK CAPACITY

WORKSTATIONS  
3406  
GS STATIONS  
#WORKSTATIONS  
RT HUMAN FACTORS ENGINEERING  
MAN MACHINE SYSTEMS  
PRODUCTIVITY  
UNIX (OPERATING SYSTEM)

WORLD  
USE EARTH (PLANET)

WORLD DATA CENTERS  
O803 3405 3409  
RT % CENTERS  
% DATA  
DATA RETRIEVAL  
DATA STORAGE  
INTERNATIONAL GEOPHYSICAL YEAR

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LIBRARIES
TRANSCOENIC SYSTEMS

WORLD METEOROLOGICAL ORGANIZATION
3403
GS
ORGANIZATIONS
#WORLD METEOROLOGICAL ORGANIZATION
RT INTERNATIONAL COOPERATION
METEOROLOGY
UNITED NATIONS

WORMS
O404
GS ANIMALS
.INVERTEBRATES
...#WORMS
...#FLATWORMS
RT INFESTATION
LARVAE
ROTIFERA

WOUND HEALING
O405 O408
GS HEALING
#WOUND HEALING
RT INJURIES

WOVEN COMPOSITES
1507 1704 1801 1805 1809
GS COMPOSITE MATERIALS
.FIBER COMPOSITES
...#WOVEN COMPOSITES
RT BRAIDED COMPOSITES
CARBON FIBER REINFORCED PLASTICS
EPOXY MATRIX COMPOSITES
FABRICS
GLASS FIBER REINFORCED PLASTICS
GRAPHITE-EPOXY COMPOSITES
REINFORCING FIBERS
THREE DIMENSIONAL COMPOSITES
WEAVING

WRANGELL MOUNTAINS (AK)
1305 1306
GS LANDFORMS
.MOUNTAINS
.#WRANGELL MOUNTAINS (AK)
RT ALASKA

% WRAP
1507 2305
SN (USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT COMPOSITE WRAPPING

PACKAGING
WRAPAROUND CONTACT SOLAR CELLS
USE SOLAR CELLS

WRECKAGE
O201 3201
RT ACCIDENT INVESTIGATION
ACCIDENTS
CRASHES
SABOTAGE
SPACECRAFT BREAKUP

WRENCHES
1504
GS TOOLS
#WRENCHES

WRINKLING
1704 3203
GS #WRINKLING
.FLANGE WRINKLING
RT BUCKLING
DEFORMATION
DISTORTION
% RIDGES

WRIST
O404
GS ANATOMY
.MUSCULOSKELETAL SYSTEM
...JOINTS (ANATOMY)
...#WRIST
RT ARM (ANATOMY)
HAND (ANATOMY)

WROUGHT ALLOYS
1504 1701 1704
GS ALLOYS
#WROUGHT ALLOYS
RT RENE 41
RENE 63
RENE 77
WASPALLOY

WU-2 AIRCRAFT
USE U-2 AIRCRAFT

WURTZITE
1804 1806 2602
GS CHALCOGENIDES
.SULFIDES
...INORGANIC SULFIDES
...ZINC SULFIDES
...#WURTZITE

MINERALS
#WURTZITE
SULFUR COMPOUNDS
.SULFIDES
...INORGANIC SULFIDES
...ZINC SULFIDES
...#WURTZITE
ZINC COMPOUNDS
.ZINC SULFIDES
#WURTZITE

WYOMING
1305
GS NATIONS
.UNITED STATES
.#WYOMING
RT BIGHORN MOUNTAINS (MT-WY)
BLACK HILLS (SD-WY)
WIND RIVER RANGE (WY)
YELLOWSTONE NATIONAL PARK
(ID-MT-WY)

W2F AIRCRAFT
USE E-2 AIRCRAFT

X BAND
USE SUPERHIGH FREQUENCIES

X MESONS
2403
GS PARTICLES
.ELEMENTARY PARTICLES
...BOSONS
...MESONS
...MESON RESONANCE
...#X MESONS
.NUCLEAR PARTICLES
...BOSONS
...MESONS
...MESON RESONANCE
...#X MESONS
RESONANCE
.MESON RESONANCE
.#X MESONS

X RAY ABSORPTION
1704 2402 2406
GS ENERGY ABSORPTION
.RADIATION ABSORPTION
...ELECTROMAGNETIC ABSORPTION
...#X RAY ABSORPTION
RT % ABSORPTION
ELECTRON SPECTROSCOPY
X RAY DETECTORS

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## NASA THESAURUS HIERARCHICAL UPDATE

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                                                                                                                                                                                                                                                                                                                          |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X | RAY ANALYSIS<br>O501 1108 1404 2406 3501<br>SN (EXCLUDES X RAY STRESS ANALYSIS)<br>GS #X RAY ANALYSIS<br>.LAUE METHOD<br>.X RAY SPECTROSCOPY<br>RT % ANALYZING<br>CHEMICAL ANALYSIS<br>CRYSTALLOGRAPHY<br>DEFECTS<br>FLUOROSCOPY<br>LATTICE PARAMETERS<br>% MATERIALS TESTS<br>MICROANALYSIS<br>MICROBEAMS<br>RADIOGRAPHY<br>RADIOLOGY<br>STEREOCHEMISTRY<br>TOMOGRAPHY                                                                 |  |  | ADVANCED X RAY ASTROPHYSICS FACILITY<br>AXAF<br>GS ARTIFICIAL SATELLITES<br>.SCIENTIFIC SATELLITES<br>..ASTRONOMICAL SATELLITES<br>..#X RAY ASTROPHYSICS FACILITY OBSERVATORIES<br>.ASTRONOMICAL OBSERVATORIES<br>..ASTRONOMICAL SATELLITES<br>..#X RAY ASTROPHYSICS FACILITY PAYLOADS<br>.SPACE SHUTTLE PAYLOADS<br>.#X RAY ASTROPHYSICS FACILITY TELESCOPES<br>.SPACEBORNE TELESCOPES<br>.#X RAY ASTROPHYSICS FACILITY .X RAY TELESCOPES<br>.#X RAY ASTROPHYSICS FACILITY ASTROPHYSICS<br>RT % FACILITIES<br>SPACEBORNE ASTRONOMY<br>X RAY ASTRONOMY |  | MEASURING INSTRUMENTS<br>.RADIATION MEASURING INSTRUMENTS<br>..ACTINOMETERS<br>..#X RAY DETECTORS<br>BOLOMETERS<br>INFRARED DETECTORS<br>MULTI-ANODE MICROCHANNEL ARRAYS<br>PHOTODIODES<br>PHOTOMETERS<br>RADIOMETERS<br>ULTRAVIOLET DETECTORS<br>X RAY ABSORPTION<br>X RAY APPARATUS<br>X RAY ASTRONOMY<br>X RAY SPECTROSCOPY<br>X RAY TELESCOPES<br>X RAYS                             |
| X | RAY APPARATUS<br>O501 1108 2402 2406<br>GS MEDICAL EQUIPMENT<br>#X RAY APPARATUS<br>..LIXISCOPIES<br>..X RAY TUBES<br>RT % EQUIPMENT<br>RADIOGRAPHY<br>X RAY DETECTORS                                                                                                                                                                                                                                                                  |  |  | ASTROPHYSICS<br>FACILITIES<br>X RAY ASTRONOMY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | X RAY DIFFRACTION<br>O710 2402 2406<br>GS DIFFRACTION<br>#X RAY DIFFRACTION<br>RT CRYSTALLOGRAPHY<br>ELECTRON DIFFRACTION<br>LAUE METHOD<br>METALLOGRAPHY<br>RADIOGRAPHY<br>X RAY OPTICS                                                                                                                                                                                                 |
| X | RAY ASTRONOMY<br>1412 2402 2406 3001<br>GS ASTRONOMY<br>#X RAY ASTRONOMY<br>COSMIC X RAYS<br>EXOSAT SATELLITE<br>GAMMA RAY ASTRONOMY<br>GAMMA RAY BURSTS<br>GINGA SATELLITE<br>GRAZING INCIDENCE TELESCOPES<br>LIXISCOPIES<br>RADIOGRAPHY<br>ROSAT MISSION<br>SAS-3<br>TENMA SATELLITE<br>UHURU SATELLITE<br>ULTRAVIOLET TELESCOPES<br>X RAY ASTROPHYSICS FACILITY<br>X RAY BINARIES<br>X RAY DETECTORS<br>X RAY SOURCES<br>X RAY STARS |  |  | BINARY STARS<br>...#X RAY BINARIES<br>..X RAY STARS<br>..#X RAY BINARIES<br>X RAY SOURCES<br>.X RAY STARS<br>.#X RAY BINARIES<br>ACCRETION DISKS<br>ASTROPHYSICS<br>BLACK HOLES (ASTRONOMY)<br>COMPANION STARS<br>COSMIC X RAYS<br>ECLIPSING BINARY STARS<br>NEUTRON STARS<br>STELLAR MASS ACCRETION<br>X RAY ASTRONOMY<br>X RAYS                                                                                                                                                                                                                      |  | X RAY FLUORESCENCE<br>O605 2306 2402 2406<br>GS EMISSION<br>.LIGHT EMISSION<br>..LUMINESCENCE<br>...FLUORESCENCE<br>...#X RAY FLUORESCENCE<br>...PHOTOLUMINESCENCE<br>...#X RAY FLUORESCENCE<br>RT RADIOGRAPHY<br>X RAY IMAGERY<br>2402<br>GS IMAGERY<br>#X RAY IMAGERY<br>RT IMAGING TECHNIQUES<br>INFRARED IMAGERY<br>LIXISCOPIES<br>MICROWAVE IMAGERY<br>RADAR IMAGERY<br>RADIOGRAPHY |
| X | RAY ASTROPHYSICS FACILITY<br>3001                                                                                                                                                                                                                                                                                                                                                                                                       |  |  | DENSITY MEASUREMENT<br>#X RAY DENSITY<br>RT FLUX DENSITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | X RAY INSPECTION<br>O501 1505 2406<br>GS INSPECTION<br>#X RAY INSPECTION                                                                                                                                                                                                                                                                                                                 |

|        |                              |         |                              |                               |
|--------|------------------------------|---------|------------------------------|-------------------------------|
| RT     | NONDESTRUCTIVE TESTS         | RT      | GINGA SATELLITE              | X RAY STRESS ANALYSIS         |
|        | RADIOGRAPHY                  |         | NORTH POLAR SPUR (ASTRONOMY) | 1404                          |
| %      | TESTS                        |         | QUASARS                      | GS                            |
|        |                              |         | SOLAR SPECTRA                | STRESS ANALYSIS               |
| X RAY  | IRRADIATION                  |         | STELLAR SPECTRA              | #X RAY STRESS ANALYSIS        |
| GS     | IRRADIATION                  |         | TENMA SATELLITE              | STRESSES                      |
|        |                              |         |                              | TEMPERATURE INVERSIONS        |
|        |                              |         |                              |                               |
| X RAY  | LASERS                       | X RAY   | SPECTROGRAPHY                | X RAY STRESS MEASUREMENT      |
| O405   | 1601                         | USE     | X RAY SPECTROSCOPY           | 1404 1406 2406 3203           |
| GS     | STIMULATED EMISSION DEVICES  | X RAY   | SPECTROMETRY                 | GS MECHANICAL MEASUREMENT     |
|        | .LASERS                      | USE     | X RAY SPECTROSCOPY           | .STRESS MEASUREMENT           |
|        |                              |         |                              | .#X RAY STRESS MEASUREMENT    |
| RT     | ELECTRON TRANSITIONS         | X RAY   | SPECTROPOLARIMETRY PAYLOAD   |                               |
|        | LASER OUTPUTS                | USE     | EXPOS (SPACELAB PAYLOAD)     |                               |
|        |                              |         |                              |                               |
| X RAY  | OPTICS                       | X RAY   | SPECTROSCOPY                 | X RAY TELESCOPES              |
| 1412   | 2310                         | 1404    | 1411 2406 2903               | 1404 1412 2406 3001           |
| RT     | GEOMETRICAL OPTICS           | UF      | X RAY SPECTROGRAPHY          | GS TELESCOPES                 |
|        | GRAZING INCIDENCE            | X RAY   | SPECTROMETRY                 | #X RAY TELESCOPES             |
|        | MIRRORS                      | GS      | SPECTROSCOPY                 | ..X RAY ASTROPHYSICS FACILITY |
| %      | OPTICS                       |         | #X RAY SPECTROSCOPY          | GRAZING INCIDENCE TELESCOPES  |
| X RAY  | DIFFRACTION                  | X RAY   | ANALYSIS                     | RADIOGRAPHY                   |
| X RAY  | TELESCOPES                   | #X RAY  | SPECTROSCOPY                 | ROSAT MISSION                 |
| X RAYS |                              | X RAY   | ANALYSIS                     | X RAY DETECTORS               |
|        |                              | #X RAY  | SPECTROSCOPY                 | X RAY OPTICS                  |
|        |                              | RT      | ASTRONOMICAL SPECTROSCOPY    | X RAY STARS                   |
|        |                              | %       | MATERIALS TESTS              |                               |
|        |                              |         | MOLECULAR SPECTROSCOPY       | X RAY TIMING EXPLORER         |
| X RAY  | SCATTERING                   |         | RADIO SPECTROSCOPY           | 3107                          |
| 1704   | 2402 2406 2601               |         | RADIOGRAPHY                  | GS ARTIFICIAL SATELLITES      |
| GS     | SCATTERING                   |         | SPECTROSCOPIC ANALYSIS       | .SCIENTIFIC SATELLITES        |
|        | .WAVE SCATTERING             |         | ULTRAVIOLET SPECTROSCOPY     | ..EXPLORER SATELLITES         |
|        | ..ELECTROMAGNETIC SCATTERING |         | VACUUM SPECTROSCOPY          | ..#X RAY TIMING EXPLORER      |
|        | ..#X RAY SCATTERING          |         | X RAY DETECTORS              |                               |
| RT     | FORM FACTORS                 | X RAY   | STARS                        | X RAY TUBES                   |
|        |                              |         |                              | O501                          |
| X RAY  | SOURCES                      | X RAY   | STARS                        | GS MEDICAL EQUIPMENT          |
| 1412   | 2402 2406 2903               | 1406    | 1412 2309 2402 3001 3002     | .X RAY APPARATUS              |
| GS     | #X RAY SOURCES               | UF      | EXTARS                       | .#X RAY TUBES                 |
|        | .X RAY STARS                 | GS      | CELESTIAL BODIES             | ELECTRON TUBES                |
|        |                              |         | .STARS                       | RADIOGRAPHY                   |
|        |                              |         | ..X RAY STARS                |                               |
| RT     | COOLING FLOWS (ASTROPHYSICS) |         | ..X RAY BINARIES             |                               |
|        | COSMIC X RAYS                | X RAY   | SOURCES                      | X RAYS                        |
|        | EXOSAT SATELLITE             | #X RAY  | STARS                        | O411 2402 2903                |
|        | GALACTIC BULGE               | ..X RAY | BINARIES                     | GS ELECTROMAGNETIC RADIATION  |
| %      | RADIATION                    | RT      | EMISSION SPECTRA             | #X RAYS                       |
| ROSAT  | MISSION                      |         | GINGA SATELLITE              | ..COSMIC X RAYS               |
| X RAY  | ASTRONOMY                    |         | NEUTRON STARS                | ..SOLAR X-RAYS                |
| X RAYS |                              |         | RADIATION SOURCES            | IONIZING RADIATION            |
|        |                              |         | STELLAR RADIATION            | #X RAYS                       |
|        |                              |         | TENMA SATELLITE              | ..COSMIC X RAYS               |
| X RAY  | SPECTRA                      |         | UHURU SATELLITE              | ..SOLAR X-RAYS                |
| O601   | 1412 2903                    |         | X RAY ASTRONOMY              | AURORAS                       |
| GS     | SPECTRA                      |         | X RAY TELESCOPES             | BLACKOUT (PROPAGATION)        |
|        | .RADIATION SPECTRA           |         | X RAYS                       | BREMSSTRAHLUNG                |
|        | ..ELECTROMAGNETIC SPECTRA    |         |                              | COSMIC RAYS                   |
|        | ..#X RAY SPECTRA             |         |                              | EMISSION SPECTRA              |



# NASA THESAURUS HIERARCHICAL UPDATE

EXTRATERRESTRIAL RADIATION  
 FAR ULTRAVIOLET RADIATION  
 GAMMA RAYS  
 MONOCHROMATIC RADIATION  
 RADIOGRAPHY  
 RADIOLOGY  
 SYNCHROTRON RADIATION  
 SYSTEM GENERATED ELECTROMAGNETIC  
 PULSES

X RAY BINARIES  
 X RAY DETECTORS  
 X RAY OPTICS  
 X RAY SOURCES  
 X RAY STARS

X WING ROTORS  
 O104  
 GS

AIRFOILS  
 .WINGS

..ROTARY WINGS  
 ..#X WING ROTORS  
 ROTATING BODIES  
 .ROTORS

..ROTARY WINGS  
 ..#X WING ROTORS  
 CIRCULATION CONTROL ROTORS  
 % ROTOR BLADES

X-Y PLOTTERS

1406 1504 1902  
 GS RECORDING INSTRUMENTS  
 .PLOTTERS

.#X-Y PLOTTERS  
 RT DIGITAL TO ANALOG CONVERTERS

X-1 AIRCRAFT  
 O207

GS BELL AIRCRAFT  
 #X-1 AIRCRAFT  
 MONOPLANES  
 #X-1 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-1 AIRCRAFT  
 ROCKET VEHICLES  
 .ROCKET PLANES  
 .#X-1 AIRCRAFT  
 SUPERSONIC AIRCRAFT  
 #X-1 AIRCRAFT  
 RT % AIRCRAFT

X-2 AIRCRAFT  
 O204 O207

GS BELL AIRCRAFT  
 #X-2 AIRCRAFT  
 MONOPLANES

#X-2 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-2 AIRCRAFT  
 ROCKET VEHICLES  
 .ROCKET PLANES  
 .#X-2 AIRCRAFT  
 SUPERSONIC AIRCRAFT  
 #X-2 AIRCRAFT  
 RT % AIRCRAFT

X-3 AIRCRAFT  
 O207 3401  
 GS

JET AIRCRAFT  
 #X-3 AIRCRAFT  
 MCDONNELL DOUGLAS AIRCRAFT  
 .DOUGLAS AIRCRAFT  
 .#X-3 AIRCRAFT  
 MONOPLANES  
 #X-3 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-3 AIRCRAFT  
 SUPERSONIC AIRCRAFT  
 #X-3 AIRCRAFT  
 RT % AIRCRAFT

X-5 AIRCRAFT  
 O207 3401  
 GS

BELL AIRCRAFT  
 #X-5 AIRCRAFT  
 JET AIRCRAFT  
 #X-5 AIRCRAFT  
 MONOPLANES  
 #X-5 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-5 AIRCRAFT  
 RT % AIRCRAFT

X-13 AIRCRAFT  
 O207

GS JET AIRCRAFT  
 #X-13 AIRCRAFT  
 MONOPLANES  
 #X-13 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-13 AIRCRAFT  
 RYAN AIRCRAFT  
 #X-13 AIRCRAFT  
 V/STOL AIRCRAFT  
 .VERTICAL TAKEOFF AIRCRAFT  
 .#X-13 AIRCRAFT  
 RT % AIRCRAFT

X-14 AIRCRAFT  
 O204 O207

GS BELL AIRCRAFT

#X-14 AIRCRAFT  
 JET AIRCRAFT  
 #X-14 AIRCRAFT  
 MONOPLANES  
 RESEARCH AIRCRAFT  
 #X-14 AIRCRAFT  
 V/STOL AIRCRAFT  
 .VERTICAL TAKEOFF AIRCRAFT  
 .#X-14 AIRCRAFT  
 RT % AIRCRAFT

X-15 AIRCRAFT  
 O204 O207

GS NORTH AMERICAN AIRCRAFT  
 #X-15 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-15 AIRCRAFT  
 ROCKET VEHICLES  
 .ROCKET PLANES  
 .#X-15 AIRCRAFT  
 SUPERSONIC AIRCRAFT  
 #X-15 AIRCRAFT  
 RT % AIRCRAFT  
 LR-99 ENGINE  
 XLR-99 ENGINE

X-17 REENTRY VEHICLE  
 3105  
 GS REENTRY VEHICLES  
 #X-17 REENTRY VEHICLE

RT ROCKET VEHICLES  
 SOLID PROPELLANT ROCKET ENGINES

X-19 AIRCRAFT  
 O204 O207

GS CURTISS-WRIGHT AIRCRAFT  
 #X-19 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #X-19 AIRCRAFT  
 TANDEM WING AIRCRAFT  
 #X-19 AIRCRAFT  
 V/STOL AIRCRAFT  
 .VERTICAL TAKEOFF AIRCRAFT  
 .#X-19 AIRCRAFT  
 RT % AIRCRAFT

X-20 AIRCRAFT  
 O204 O207

UF DYNA-SOAR SPACE GLIDER  
 GS BOEING AIRCRAFT  
 #X-20 AIRCRAFT  
 GLIDERS  
 .BOOSTGLIDE VEHICLES  
 .#X-20 AIRCRAFT

```

    .HYPERSONIC GLIDERS
    .#X-20 AIRCRAFT
    HYPERSONIC VEHICLES
    .HYPERSONIC AIRCRAFT
    ..HYPERSONIC GLIDERS
    ..#X-20 AIRCRAFT
    LIFTING BODIES
    .LIFTING REENTRY VEHICLES
    .#X-20 AIRCRAFT
    MANEUVERABLE SPACECRAFT
    #X-20 AIRCRAFT
    REENTRY VEHICLES
    .BOOSTGLIDE VEHICLES
    .#X-20 AIRCRAFT
    .MANEUVERABLE REENTRY BODIES
    ..LIFTING REENTRY VEHICLES
    ..#X-20 AIRCRAFT
    RESEARCH AIRCRAFT
    #X-20 AIRCRAFT
    AEROSPACE PLANES
    % AIRCRAFT
    MANNED SPACECRAFT
    SOFT LANDING SPACECRAFT

    RT
    % AIRCRAFT
    MANNED SPACECRAFT
    SOFT LANDING SPACECRAFT

    X-21 AIRCRAFT
    O204 O207
    GS
    JET AIRCRAFT
    #X-21 AIRCRAFT
    MONOPLANES
    #X-21 AIRCRAFT
    NORTHROP AIRCRAFT
    #X-21 AIRCRAFT
    RESEARCH AIRCRAFT
    #X-21 AIRCRAFT
    % AIRCRAFT
    BOUNDARY LAYER CONTROL
    LAMINAR BOUNDARY LAYER

    X-21A AIRCRAFT
    O207
    GS
    JET AIRCRAFT
    #X-21A AIRCRAFT
    MONOPLANES
    #X-21A AIRCRAFT
    NORTHROP AIRCRAFT
    #X-21A AIRCRAFT
    RESEARCH AIRCRAFT
    #X-21A AIRCRAFT
    % AIRCRAFT
    LAMINAR FLOW

    X-22 AIRCRAFT
    O204 O207
    GS
    BELL AIRCRAFT
    #X-22 AIRCRAFT

    RESEARCH AIRCRAFT
    #X-22 AIRCRAFT
    V/STOL AIRCRAFT
    .VERTICAL TAKEOFF AIRCRAFT
    .#X-22 AIRCRAFT
    RT % AIRCRAFT
    TANDEN WING AIRCRAFT
    TILT WING AIRCRAFT

    X-22A AIRCRAFT
    O207
    GS
    RESEARCH AIRCRAFT
    #X-22A AIRCRAFT
    TANDEN WING AIRCRAFT
    #X-22A AIRCRAFT
    V/STOL AIRCRAFT
    .VERTICAL TAKEOFF AIRCRAFT
    .#X-22A AIRCRAFT
    RT % AIRCRAFT

    X-24 AIRCRAFT
    O103 O205 O207
    GS
    LIFTING BODIES
    .LIFTING REENTRY VEHICLES
    .#X-24 AIRCRAFT
    REENTRY VEHICLES
    .MANEUVERABLE REENTRY BODIES
    ..LIFTING REENTRY VEHICLES
    ..#X-24 AIRCRAFT
    RESEARCH AIRCRAFT
    #X-24 AIRCRAFT
    RT % AIRCRAFT

    X-24 AIRCRAFT
    O103 O205 O207
    GS
    LIFTING BODIES
    .LIFTING REENTRY VEHICLES
    .#X-24 AIRCRAFT
    REENTRY VEHICLES
    .MANEUVERABLE REENTRY BODIES
    ..LIFTING REENTRY VEHICLES
    ..#X-24 AIRCRAFT
    RESEARCH AIRCRAFT
    #X-24 AIRCRAFT
    RT % AIRCRAFT

    X-29 AIRCRAFT
    O201 O207
    RT % AIRCRAFT
    SWEPT FORWARD WINGS

    X-30 VEHICLE
    3110 3501
    GS
    AEROSPACE VEHICLES
    .AEROSPACE PLANES
    .#X-30 VEHICLE
    HYPERSONIC VEHICLES
    #X-30 VEHICLE
    MANEUVERABLE SPACECRAFT
    .AEROSPACE PLANES
    .#X-30 VEHICLE
    MANNED SPACECRAFT
    .AEROSPACE PLANES
    .#X-30 VEHICLE
    REENTRY VEHICLES
    .RECOVERABLE SPACECRAFT
    ..REUSABLE SPACECRAFT
    ...AEROSPACE PLANES

    .HYPERSONIC GLIDERS
    .#X-30 VEHICLE
    RESEARCH VEHICLES
    #X-30 VEHICLE
    SOFT LANDING SPACECRAFT
    .AEROSPACE PLANES
    .#X-30 VEHICLE
    NATIONAL AEROSPACE PLANE PROGRAM
    SINGLE STAGE TO ORBIT VEHICLES
    % SPACECRAFT
    TRANSATMOSPHERIC VEHICLES

    X-248 ENGINE
    2808
    UF
    ALT AIR ENGINE
    GS
    .ROCKET ENGINES
    ..SOLID PROPELLANT ROCKET ENGINES
    ..#X-248 ENGINE
    BLUE SCOUT ROCKET VEHICLE
    SCOUT LAUNCH VEHICLE
    VANGUARD 2 LAUNCH VEHICLE

    RT
    % AIRCRAFT
    MANNED SPACECRAFT
    SOFT LANDING SPACECRAFT

    X-254 ENGINE
    2808
    GS
    ENGINES
    .ROCKET ENGINES
    ..SOLID PROPELLANT ROCKET ENGINES
    ..#X-254 ENGINE
    ANTARES ROCKET VEHICLE
    BLUE SCOUT ROCKET VEHICLE
    SCOUT LAUNCH VEHICLE

    X-258 ENGINES
    2808
    GS
    ENGINES
    .ROCKET ENGINES
    ..SOLID PROPELLANT ROCKET ENGINES
    ..#X-258 ENGINES
    ...X-258-B1 ENGINE
    SCOUT LAUNCH VEHICLE

    X-258-B1 ENGINE
    2808
    GS
    ENGINES
    .ROCKET ENGINES
    ..SOLID PROPELLANT ROCKET ENGINES
    ..X-258 ENGINES
    ...X-258-B1 ENGINE

    X-259 ENGINE
    2808
    GS
    ENGINES
    .ROCKET ENGINES
    ..SOLID PROPELLANT ROCKET ENGINES
    ...X-259 ENGINE
  
```

[illegible]

XENON 133  
 O603 1807 2406  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 .ISOTOPIES  
 ...RADIOACTIVE ISOTOPIES  
 ...#XENON 133  
 ...XENON ISOTOPIES  
 ...#XENON 133  
 .RARE GASES  
 .XENON  
 ...XENON ISOTOPIES  
 ...#XENON 133  
 GASES  
 .RARE GASES  
 .XENON  
 ...XENON ISOTOPIES  
 ...#XENON 133  
 XENON 135  
 O603 1807 2406  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 .ISOTOPIES  
 ...RADIOACTIVE ISOTOPIES  
 ...#XENON 135  
 ...XENON ISOTOPIES  
 ...#XENON 135  
 .RARE GASES  
 .XENON  
 ...XENON ISOTOPIES  
 ...#XENON 135  
 GASES  
 .RARE GASES  
 .XENON  
 ...XENON ISOTOPIES  
 ...#XENON 135  
 XEROGRAPHY  
 1002 1504 2402 3405  
 GS IMAGERY  
 .REPRODUCTION (COPYING)  
 .#XEROGRAPHY  
 RT ELECTROSTATIC CHARGE  
 PHOTOGRAPHS  
 PHOTOGRAPHY  
 XH-51 HELICOPTER  
 O206  
 UF AEROGYRO HELICOPTERS

CL-595 HELICOPTER  
 H-51 HELICOPTER  
 LOCKHEED CL-595 HELICOPTER  
 LOCKHEED 186 HELICOPTER  
 LOCKHEED AIRCRAFT  
 #XH-51 HELICOPTER  
 RESEARCH AIRCRAFT  
 #XH-51 HELICOPTER  
 V/STOL AIRCRAFT  
 .ROTARY WING AIRCRAFT  
 ..HELICOPTERS  
 ...RIGID ROTOR HELICOPTERS  
 ...#XH-51 HELICOPTER  
 GS  
 XI HYPERONS  
 2403  
 GS PARTICLES  
 .ELEMENTARY PARTICLES  
 ..BOSONS  
 ...#XI HYPERONS  
 ..FERMIONS  
 ...BARYONS  
 ....HYPERONS  
 ....#XI HYPERONS  
 .NUCLEAR PARTICLES  
 ..BOSONS  
 ...#XI HYPERONS  
 XJ-34-WE-32 ENGINE  
 USE J-34 ENGINE  
 XJ-79-GE-1 ENGINE  
 USE J-79 ENGINE  
 XLR-91-AJ-5 ENGINE  
 USE LR-91-AJ-5 ENGINE  
 XLR-99 ENGINE  
 2808  
 GS ENGINES  
 .ROCKET ENGINES  
 ..LIQUID PROPELLANT ROCKET ENGINES  
 ..#XLR-99 ENGINE  
 RT X-15 AIRCRAFT  
 XM-6 SQUIB  
 USE SQUIBS  
 XM-8 SQUIB  
 USE SQUIBS  
 XM-33 ENGINE  
 2808  
 UF TX-33-39 ENGINE  
 GS ENGINES

.ROCKET ENGINES  
 ..SOLID PROPELLANT ROCKET ENGINES  
 ..#XM-33 ENGINE  
 BLUE SCOUT ROCKET VEHICLE  
 EXOS SOUNDING ROCKET  
 LITTLE JOE 2 LAUNCH VEHICLE  
 POLARIS MISSILES  
 SCOUT LAUNCH VEHICLE  
 TX-354 ENGINE  
 RT  
 XV-3 AIRCRAFT  
 O207 O209 3401  
 UF V-3 AIRCRAFT  
 GS BELL AIRCRAFT  
 #XV-3 AIRCRAFT  
 V/STOL AIRCRAFT  
 #XV-3 AIRCRAFT  
 RT % AIRCRAFT  
 TILTING ROTORS  
 XV-4 AIRCRAFT  
 O207 O209 3401  
 UF HUMMINGBIRD AIRCRAFT  
 LOCKHEED XV-4A AIRCRAFT  
 V-4 AIRCRAFT  
 VZ-10 AIRCRAFT  
 JET AIRCRAFT  
 #XV-4 AIRCRAFT  
 LOCKHEED AIRCRAFT  
 #XV-4 AIRCRAFT  
 MONOPLANES  
 #XV-4 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #XV-4 AIRCRAFT  
 V/STOL AIRCRAFT  
 .VERTICAL TAKEOFF AIRCRAFT  
 .#XV-4 AIRCRAFT  
 RT % AIRCRAFT  
 XV-5 AIRCRAFT  
 O207  
 UF V-5 AIRCRAFT  
 VZ-11 AIRCRAFT  
 XV-5A AIRCRAFT  
 FAN IN WING AIRCRAFT  
 #XV-5 AIRCRAFT  
 JET AIRCRAFT  
 #XV-5 AIRCRAFT  
 MONOPLANES  
 #XV-5 AIRCRAFT  
 RESEARCH AIRCRAFT  
 #XV-5 AIRCRAFT  
 RYAN AIRCRAFT  
 #XV-5 AIRCRAFT  
 V/STOL AIRCRAFT

| #XV-5 AIRCRAFT | RT % AIRCRAFT |
|----------------|---------------|
| 1              | 100           |
| 2              | 100           |
| 3              | 100           |
| 4              | 100           |
| 5              | 100           |
| 6              | 100           |
| 7              | 100           |
| 8              | 100           |
| 9              | 100           |
| 10             | 100           |
| 11             | 100           |
| 12             | 100           |
| 13             | 100           |
| 14             | 100           |
| 15             | 100           |
| 16             | 100           |
| 17             | 100           |
| 18             | 100           |
| 19             | 100           |
| 20             | 100           |
| 21             | 100           |
| 22             | 100           |
| 23             | 100           |
| 24             | 100           |
| 25             | 100           |
| 26             | 100           |
| 27             | 100           |
| 28             | 100           |
| 29             | 100           |
| 30             | 100           |
| 31             | 100           |
| 32             | 100           |
| 33             | 100           |
| 34             | 100           |
| 35             | 100           |
| 36             | 100           |
| 37             | 100           |
| 38             | 100           |
| 39             | 100           |
| 40             | 100           |
| 41             | 100           |
| 42             | 100           |
| 43             | 100           |
| 44             | 100           |
| 45             | 100           |
| 46             | 100           |
| 47             | 100           |
| 48             | 100           |
| 49             | 100           |
| 50             | 100           |
| 51             | 100           |
| 52             | 100           |
| 53             | 100           |
| 54             | 100           |
| 55             | 100           |
| 56             | 100           |
| 57             | 100           |
| 58             | 100           |
| 59             | 100           |
| 60             | 100           |
| 61             | 100           |
| 62             | 100           |
| 63             | 100           |
| 64             | 100           |
| 65             | 100           |
| 66             | 100           |
| 67             | 100           |
| 68             | 100           |
| 69             | 100           |
| 70             | 100           |
| 71             | 100           |
| 72             | 100           |
| 73             | 100           |
| 74             | 100           |
| 75             | 100           |
| 76             | 100           |
| 77             | 100           |
| 78             | 100           |
| 79             | 100           |
| 80             | 100           |
| 81             | 100           |
| 82             | 100           |
| 83             | 100           |
| 84             | 100           |
| 85             | 100           |
| 86             | 100           |
| 87             | 100           |
| 88             | 100           |
| 89             | 100           |
| 90             | 100           |
| 91             | 100           |
| 92             | 100           |
| 93             | 100           |
| 94             | 100           |
| 95             | 100           |
| 96             | 100           |
| 97             | 100           |
| 98             | 100           |
| 99             | 100           |
| 100            | 100           |

XV-6A AIRCRAFT  
USE P-1127 AIRCRAFT

#XV-8A AIRCRAFT  
RYAN AIRCRAFT

#XV-8A AIRCRAFT  
V/STOL AIRCRAFT

FLEXIBLE WINGS

UF V-9 AIRCRAFT  
GS HUGHES AIRCRAFT

#AV-9A AIRCRAFT  
RESEARCH AIRCRAFT  
#VV-9A AIRCRAFT

..HELICOPTERS  
MILITARY HELICOPTERS

TIP DRIVEN ROTORS

GS RESEARCH AIRCRAFT  
#XV-11A AIRCRAFT

| #XV-11A AIRCRAFT | RT % AIRCRAFT |
|------------------|---------------|
| 1                | 100           |
| 2                | 100           |
| 3                | 100           |
| 4                | 100           |
| 5                | 100           |
| 6                | 100           |
| 7                | 100           |
| 8                | 100           |
| 9                | 100           |
| 10               | 100           |
| 11               | 100           |
| 12               | 100           |
| 13               | 100           |
| 14               | 100           |
| 15               | 100           |
| 16               | 100           |
| 17               | 100           |
| 18               | 100           |
| 19               | 100           |
| 20               | 100           |
| 21               | 100           |
| 22               | 100           |
| 23               | 100           |
| 24               | 100           |
| 25               | 100           |
| 26               | 100           |
| 27               | 100           |
| 28               | 100           |
| 29               | 100           |
| 30               | 100           |
| 31               | 100           |
| 32               | 100           |
| 33               | 100           |
| 34               | 100           |
| 35               | 100           |
| 36               | 100           |
| 37               | 100           |
| 38               | 100           |
| 39               | 100           |
| 40               | 100           |
| 41               | 100           |
| 42               | 100           |
| 43               | 100           |
| 44               | 100           |
| 45               | 100           |
| 46               | 100           |
| 47               | 100           |
| 48               | 100           |
| 49               | 100           |
| 50               | 100           |
| 51               | 100           |
| 52               | 100           |
| 53               | 100           |
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| 55               | 100           |
| 56               | 100           |
| 57               | 100           |
| 58               | 100           |
| 59               | 100           |
| 60               | 100           |
| 61               | 100           |
| 62               | 100           |
| 63               | 100           |
| 64               | 100           |
| 65               | 100           |
| 66               | 100           |
| 67               | 100           |
| 68               | 100           |
| 69               | 100           |
| 70               | 100           |
| 71               | 100           |
| 72               | 100           |
| 73               | 100           |
| 74               | 100           |
| 75               | 100           |
| 76               | 100           |
| 77               | 100           |
| 78               | 100           |
| 79               | 100           |
| 80               | 100           |
| 81               | 100           |
| 82               | 100           |
| 83               | 100           |
| 84               | 100           |
| 85               | 100           |
| 86               | 100           |
| 87               | 100           |
| 88               | 100           |
| 89               | 100           |
| 90               | 100           |
| 91               | 100           |
| 92               | 100           |
| 93               | 100           |
| 94               | 100           |
| 95               | 100           |
| 96               | 100           |
| 97               | 100           |
| 98               | 100           |
| 99               | 100           |
| 100              | 100           |

XV-15 AIRCRAFT

#XV-15 AIRCRAFT  
V/STOL AIRCRAFT

..#XV-15 AIRCRAFT  
AIRCRAFT

PROGRAM

## ORGANIC COMPOUNDS - HYDROCARBONS

.. CARBOHYDRATES  
.. SUGARS  
MONOSACCHARIDES

...#AYLUSE  
-0 SUPERCONDUCTORS

RNET )  
YTTRIUM-ALUMINIUM GARNET

1804  
ELECTRONIC EQUIPMENT

..#YAG LASERS  
STIMULATED EMISSION DI

..#YAG LASERS  
LASER HEATING

TENNAS

```
.DIRECTIONAL ANTENNAS
.#YAGI ANTENNAS
ADDAVC
```

```
...LINEAR ARRAYS
...ENDFIRE ARRAYS
...VACI ANTENNA
```

1611

PARASITIC ELEMENTS (ANTENNAS)  
WAVEGUIDE ANTENNAS

GENERAL AVIATION AIRCRAFT

#YAK 40 AIRCRAFT  
LIGHT AIRCRAFT

#YAK 40 AIRCRAFT  
AIRCRAFT

ELECTROMAGNETIC FIELDS

GRAVITATIONAL FIELDS  
PERTURBATION THEORY  
YANG MING C. THEORY

FIELD THEORY (PHYSICS)

PERFORMANCE MEASUREMENTS  
SPACE-TIME FUNCTIONS  
STATISTICAL ANALYSIS

THEORIES  
YANG-MILLS FIELDS

CORDAGE

ROVINGS  
STRANDS

AIRCRAFT  
HARRIER AIRCRAFT

0201  
DAMPING IN YAW  
SIGHTING





|                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT % CHEMICAL COMPOUNDS<br>% GROUP 3B COMPOUNDS<br>% METAL COMPOUNDS                                                                                                                                                                                                                                                   | .GARNETS<br>.#YTTRIUM-IRON GARNET<br>SILICON COMPOUNDS<br>.SILICATES<br>..GARNETS<br>..#YTTRIUM-IRON GARNET<br>YTTRIUM COMPOUNDS<br>#YTTRIUM-IRON GARNET<br>FERRITES<br>MAGNETOSTATIC AMPLIFIERS<br>WAVEGUIDE TUNERS                                                                                                                                                                                                                                                                                                                                             | #ZAIRE<br>RT AFRICA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| YTTRIUM ISOTOPIES<br>0603 1703 1704 2406<br>GS CHEMICAL ELEMENTS<br>.NUCLIDES<br>..ISOTOPIES<br>..#YTTRIUM ISOTOPIES<br>..RARE EARTH ELEMENTS<br>..YTTRIUM<br>..#YTTRIUM ISOTOPIES<br>METALS<br>..RARE EARTH ELEMENTS<br>..YTTRIUM<br>..#YTTRIUM ISOTOPIES<br>..TRANSITION METALS<br>..YTTRIUM<br>..#YTTRIUM ISOTOPIES | RT<br>YUGOSLAVIA<br>1305<br>GS NATIONS<br>#YUGOSLAVIA<br>RT ADRIATIC SEA<br>EUROPE<br>YUH-1 HELICOPTER<br>USE UH-1 HELICOPTER<br>YUH-60A HELICOPTER<br>USE UH-60A HELICOPTER<br>YUH-61A HELICOPTER<br>USE UH-61A HELICOPTER<br>YUKAWA POTENTIAL<br>2401 2403 2405<br>RT MESON-NUCLEON INTERACTIONS<br>% POTENTIAL<br>YUKON AIRCRAFT<br>USE CL-44 AIRCRAFT<br>YUKON TERRITORY<br>1305<br>GS NATIONS<br>.CANADA<br>.#YUKON TERRITORY<br>Z-37 AIRCRAFT<br>0201<br>UF OMNIPOL Z-37 AIRCRAFT<br>GS MONOPLANES<br>#Z-37 AIRCRAFT<br>UTILITY AIRCRAFT<br>#Z-37 AIRCRAFT | ZAMBIA<br>1305<br>GS NATIONS<br>#ZAMBIA<br>RT AFRICA<br>ZEEMAN EFFECT<br>2307 2401 2403<br>RT % EFFECTS<br>MAGNETIC FIELDS<br>SPECTROSCOPY<br>SPECTRUM ANALYSIS<br>STARK EFFECT<br>VOIGT EFFECT<br>ZENER DIODES<br>USE AVALANCHE DIODES<br>ZENER EFFECT<br>1001 1002 2304<br>RT BARRIER LAYERS<br>CARRIER DENSITY (SOLID STATE)<br>% CARRIERS<br>% EFFECTS<br>ELECTRIC DISCHARGES<br>FIELD EMISSION<br>ZENITH<br>1901 3001 3003<br>RT ANTIPODES<br>APEXES<br>CELESTIAL SPHERE<br>MAXIMA<br>NOON<br>SOLAR POSITION<br>ZEOLITES<br>0603 1806<br>GS SILICON COMPOUNDS<br>.SILICATES<br>.#ZEOLITES<br>RT ION EXCHANGE RESINS<br>MINERALS<br>ZERO ANGLE OF ATTACK<br>0101 0201 1202 1203<br>GS GEOMETRY<br>.EUCLIDEAN GEOMETRY<br>..ANGLES (GEOMETRY)<br>...ANGLE OF ATTACK<br>...#ZERO ANGLE OF ATTACK |
| YTTRIUM LITHIUM FLUORIDE LASERS<br>USE YLF LASERS                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| YTTRIUM OXIDES<br>0603 1804<br>GS CHALCOGENIDES<br>.OXIDES<br>..METAL OXIDES<br>..#YTTRIUM OXIDES<br>YTTRIUM COMPOUNDS<br>YTTRIUM OXIDES<br>HIGH TEMPERATURE SUPERCONDUCTORS<br>YBCO SUPERCONDUCTORS<br>YTTRIA-STABILIZED ZIRCONIA                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| YTTRIUM-ALUMINUM GARNET<br>1804 2601<br>UF YAG (GARNET)<br>GS MINERALS<br>.GARNETS<br>.#YTTRIUM-ALUMINUM GARNET<br>SILICON COMPOUNDS<br>.SILICATES<br>..GARNETS<br>..#YTTRIUM-ALUMINUM GARNET<br>YTTRIUM COMPOUNDS<br>#YTTRIUM-ALUMINUM GARNET<br>FERRITES<br>MAGNETOSTATIC AMPLIFIERS                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| YTTRIUM-IRON GARNET<br>1804 2601<br>UF YIG (GARNET)<br>GS MINERALS                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



[illegible]

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ZINC ALLOYS
1701 1704
GS ALLOYS
RT BEARING ALLOYS
SOLDERS

ZINC ANTIMONIDES
0603 1804
GS ANTIMONY COMPOUNDS
ANTIMONIDES
.#ZINC ANTIMONIDES
ZINC COMPOUNDS
#ZINC ANTIMONIDES

ZINC CHLORIDES
1804
GS HALOGEN COMPOUNDS
.CHLORINE COMPOUNDS
..CHLORIDES
..#ZINC CHLORIDES
..HALIDES
..CHLORIDES
..#ZINC CHLORIDES
..METAL HALIDES
..#ZINC CHLORIDES
ZINC COMPOUNDS
#ZINC CHLORIDES

ZINC COATINGS
1802
UF GALVANIZING
GS COATINGS
.METAL COATINGS
.#ZINC COATINGS
RT PROTECTIVE COATINGS

ZINC COMPOUNDS
0603 1804
GS #ZINC COMPOUNDS
.ZINC ANTIMONIDES
.ZINC CHLORIDES
.ZINC FLUORIDES
.ZINC OXIDES
.ZINC SELENIDES
.ZINC SULFIDES
..WURTZITE
..ZINCBLLENDE
.ZINC TELLURIDES
.ZINC TUNGSTATES
RT % CHEMICAL COMPOUNDS
% GROUP 2B COMPOUNDS
% METAL COMPOUNDS

ZINC FLUORIDES
0603 1804
GS HALOGEN COMPOUNDS
.FLUORINE COMPOUNDS
..FLUORIDES
...METAL FLUORIDES
...#ZINC FLUORIDES
ZINC COMPOUNDS
#ZINC FLUORIDES

ZINC ISOTOPES
0703 2406
GS CHEMICAL ELEMENTS
.NUCLIDES
..ISOTOPES
..#ZINC ISOTOPES
.ZINC
.#ZINC ISOTOPES
METALS
.TRANSITION METALS
..ZINC
..#ZINC ISOTOPES

ZINC NICKEL BATTERIES
USE NICKEL ZINC BATTERIES

ZINC OXIDES
0603 1804
GS CHALCOGENIDES
.OXIDES
..METAL OXIDES
..#ZINC OXIDES
ZINC COMPOUNDS
#ZINC OXIDES

ZINC SELENIDES
0603 1804
GS CHALCOGENIDES
.SELENIDES
.#ZINC SELENIDES
SELENIUM COMPOUNDS
.SELENIDES
.#ZINC SELENIDES
ZINC COMPOUNDS
#ZINC SELENIDES
RT SCHOTTKY DIODES

ZINC SILVER BATTERIES
USE SILVER ZINC BATTERIES

ZINC SILVER OXIDE BATTERIES
USE SILVER ZINC BATTERIES

ZINC SULFIDES
0603 1804

ZINC TELLURIDES
0603 1804
GS CHALCOGENIDES
.TELLURIDES
.#ZINC TELLURIDES
TELLURIUM COMPOUNDS
.TELLURIDES
.#ZINC TELLURIDES
ZINC COMPOUNDS
#ZINC TELLURIDES

ZINC TUNGSTATES
0603 1804
GS TUNGSTEN COMPOUNDS
.TUNGSTATES
.#ZINC TUNGSTATES
ZINC COMPOUNDS
#ZINC TUNGSTATES

ZINC-BROMIDE BATTERIES
0902
GS ELECTROCHEMICAL CELLS
.ELECTRIC BATTERIES
..STORAGE BATTERIES
..#ZINC-BROMIDE BATTERIES
RT ZINC-CHLORINE BATTERIES

ZINC-CHLORINE BATTERIES
0904
GS ELECTROCHEMICAL CELLS
.ELECTRIC BATTERIES
..STORAGE BATTERIES
..#ZINC-CHLORINE BATTERIES
RT ZINC-BROMIDE BATTERIES

ZINC-OXYGEN BATTERIES
0302 0904 0905 3401
GS ELECTRIC GENERATORS

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# NASA THESAURUS HIERARCHICAL UPDATE

.DIRECT POWER GENERATORS  
 ..PRIMARY BATTERIES  
 ...METAL AIR BATTERIES  
 ...#ZINC-OXYGEN BATTERIES  
 ELECTROCHEMICAL CELLS  
 .ELECTRIC BATTERIES  
 ..PRIMARY BATTERIES  
 ...METAL AIR BATTERIES  
 ...#ZINC-OXYGEN BATTERIES

## ZINCBLLENDE

1806  
 UF SPHALERITE  
 GS CHALCOGENIDES  
 .SULFIDES  
 ..INORGANIC SULFIDES  
 ...ZINC SULFIDES  
 ...#ZINCBLLENDE  
 MINERALS  
 #ZINCBLLENDE  
 SULFUR COMPOUNDS  
 .SULFIDES  
 ..INORGANIC SULFIDES  
 ...ZINC SULFIDES  
 ...#ZINCBLLENDE  
 ZINC COMPOUNDS  
 .ZINC SULFIDES  
 .#ZINCBLLENDE

## ZIPPERS

0508  
 GS FASTENERS  
 #ZIPPERS  
 RT HOLDERS

## ZIRCALOY 2 (TRADEMARK)

1701 1704 3305  
 GS ALLOYS  
 .ZIRCONIUM ALLOYS  
 ..ZIRCALOYS (TRADEMARK)  
 ...#ZIRCALOY 2 (TRADEMARK)

## ZIRCALOYS (TRADEMARK)

1701 1704 3305  
 GS ALLOYS  
 .ZIRCONIUM ALLOYS  
 ..ZIRCALOYS (TRADEMARK)  
 ...ZIRCALOY 2 (TRADEMARK)  
 RT IRON ALLOYS  
 TIN ALLOYS

## ZIRCONATES

0603  
 GS ZIRCONIUM COMPOUNDS  
 #ZIRCONATES

..BARIUM ZIRCONATES  
 ..STRONTIUM ZIRCONATES

## ZIRCONIA

USE ZIRCONIUM OXIDES

## ZIRCONIUM

0603 1703  
 GS CHEMICAL ELEMENTS  
 #ZIRCONIUM  
 ..ZIRCONIUM ISOTOPES  
 ...ZIRCONIUM 95  
 METALS  
 .TRANSITION METALS  
 .#ZIRCONIUM  
 ...ZIRCONIUM ISOTOPES  
 ....ZIRCONIUM 95

## ZIRCONIUM ALLOYS

1701 1704  
 GS ALLOYS  
 #ZIRCONIUM ALLOYS  
 ..ZIRCALOYS (TRADEMARK)  
 ...ZIRCALOY 2 (TRADEMARK)  
 RT HAFNIUM ALLOYS  
 LITHIUM ALLOYS

## ZIRCONIUM CARBIDES

0603  
 GS CARBON COMPOUNDS  
 .CARBIDES  
 .#ZIRCONIUM CARBIDES  
 ZIRCONIUM COMPOUNDS  
 #ZIRCONIUM CARBIDES

## ZIRCONIUM COMPOUNDS

0603  
 GS #ZIRCONIUM COMPOUNDS  
 .ZIRCONATES  
 ..BARIUM ZIRCONATES  
 ..STRONTIUM ZIRCONATES  
 .ZIRCONIUM CARBIDES  
 .ZIRCONIUM HYDRIDES  
 .ZIRCONIUM IODIDES  
 .ZIRCONIUM NITRIDES  
 .ZIRCONIUM OXIDES  
 .YTTRIA-STABILIZED ZIRCONIA  
 .ZIRCONIUM TITANATES  
 RT % CHEMICAL COMPOUNDS  
 % GROUP 4B COMPOUNDS  
 % METAL COMPOUNDS

## ZIRCONIUM HYDRIDES

0603 1804  
 GS HYDROGEN COMPOUNDS

.HYDRIDES  
 .#ZIRCONIUM HYDRIDES  
 ZIRCONIUM COMPOUNDS  
 #ZIRCONIUM HYDRIDES

## ZIRCONIUM IODIDES

0603 1804  
 GS HALOGEN COMPOUNDS  
 .HALIDES  
 ..METAL HALIDES  
 ...#ZIRCONIUM IODIDES  
 .IODINE COMPOUNDS  
 ..IODIDES  
 ...#ZIRCONIUM IODIDES  
 ZIRCONIUM COMPOUNDS  
 #ZIRCONIUM IODIDES

## ZIRCONIUM ISOTOPES

2406  
 GS CHEMICAL ELEMENTS  
 .NUCLIDES  
 ..ISOTOPES  
 ...#ZIRCONIUM ISOTOPES  
 ....ZIRCONIUM 95  
 .ZIRCONIUM  
 .#ZIRCONIUM ISOTOPES  
 ...ZIRCONIUM 95  
 METALS  
 .TRANSITION METALS  
 ..ZIRCONIUM  
 ...#ZIRCONIUM ISOTOPES  
 ....ZIRCONIUM 95

## ZIRCONIUM NITRIDES

0603 1804  
 GS NITROGEN COMPOUNDS  
 .NITRIDES  
 ..METAL NITRIDES  
 ...#ZIRCONIUM NITRIDES  
 ZIRCONIUM COMPOUNDS  
 #ZIRCONIUM NITRIDES

## ZIRCONIUM OXIDES

0603 1804  
 UF ZIRCONIA  
 GS CHALCOGENIDES  
 .OXIDES  
 ..METAL OXIDES  
 ...#ZIRCONIUM OXIDES  
 ....YTTRIA-STABILIZED ZIRCONIA  
 ZIRCONIUM COMPOUNDS  
 #ZIRCONIUM OXIDES  
 .YTTRIA-STABILIZED ZIRCONIA

## ZIRCONIUM TITANATES



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.ZOND 2 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 2 SPACE PROBE
SOVIET SPACECRAFT
.ZOND SPACE PROBES
.ZOND 2 SPACE PROBE
UNMANNED SPACECRAFT
SPACE PROBES
..MARS PROBES
..ZOND 2 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 2 SPACE PROBE

ZOND 3 SPACE PROBE
3108
GS INTERPLANETARY SPACECRAFT
.VENUS PROBES
.ZOND 3 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 3 SPACE PROBE
SOVIET SPACECRAFT
.ZOND SPACE PROBES
.ZOND 3 SPACE PROBE
UNMANNED SPACECRAFT
SPACE PROBES
..VENUS PROBES
..ZOND 3 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 3 SPACE PROBE

ZOND 4 SPACE PROBE
3108
GS INTERPLANETARY SPACECRAFT
.VENUS PROBES
.ZOND 4 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 4 SPACE PROBE
SOVIET SPACECRAFT
.ZOND SPACE PROBES
.ZOND 4 SPACE PROBE
UNMANNED SPACECRAFT
SPACE PROBES
..VENUS PROBES
..ZOND 4 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 4 SPACE PROBE

ZOND 5 SPACE PROBE
3108
GS INTERPLANETARY SPACECRAFT
.VENUS PROBES
.ZOND 5 SPACE PROBE
.ZOND SPACE PROBES
.ZOND 5 SPACE PROBE
SOVIET SPACECRAFT

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1619

ZUNI ROCKET VEHICLE  
3101 3401  
GS ROCKET VEHICLES  
.SINGLE STAGE ROCKET VEHICLES  
.#ZUNI ROCKET VEHICLE  
RT SOLID PROPELLANT ROCKET ENGINES